JUNE 1953

MECCANO MAGAZINE

1/-

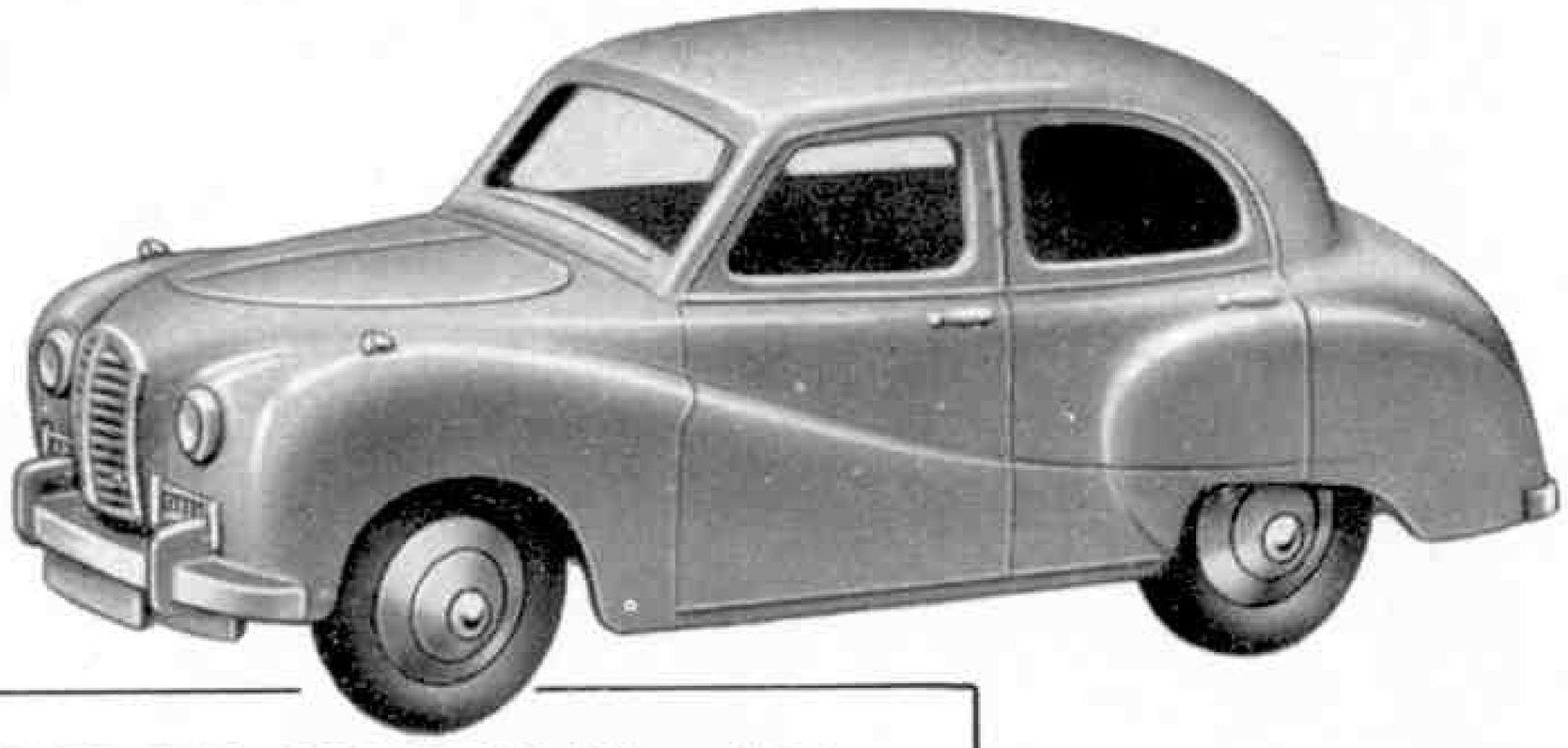
THE MECCANO MAGAZINE

NEW

DINKY TOYS

TRADE MARK REGD.

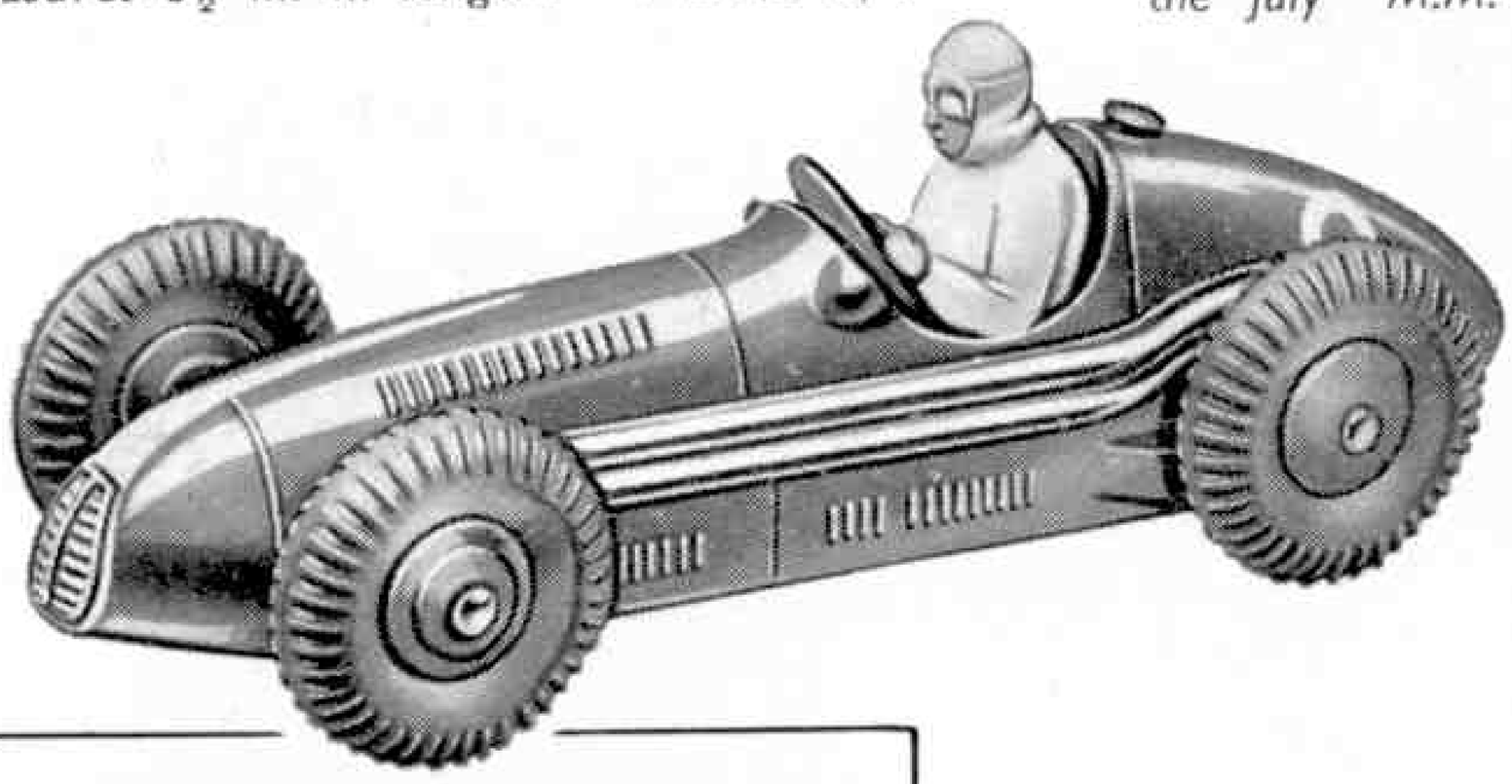
Ready during June



AUSTIN SOMERSET SALOON No. 40J

One of the most popular cars on British roads today is the Austin Somerset Saloon, and it provides an excellent subject for another fine Dinky Toy. The model is available in either bright red or light blue, and measures $3\frac{1}{2}$ in. in length. **PRICE 2/4**

These two fine models will form the subjects of a special article in the July "M.M."



MASERATI RACING CAR No. 23N

Here is another new Formula II racing car, the fifth in the Dinky Toys range. It is a scale miniature of the Italian-built Maserati, which has earned a great reputation by its performances in international track events. The Dinky Toys model is finished in the racing colours of Switzerland—bright red body with a white flash on the bonnet—and measures $3\frac{3}{4}$ in. **PRICE 2/8**

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TRADE MARK REGD.

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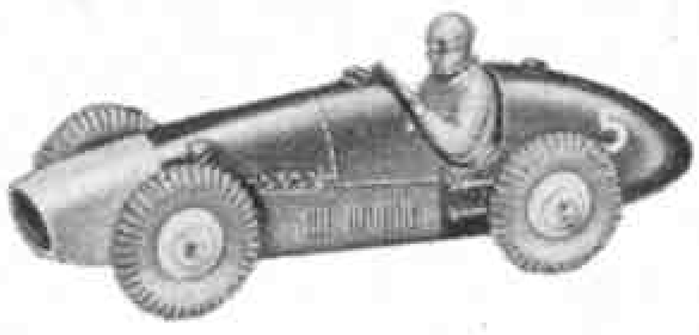
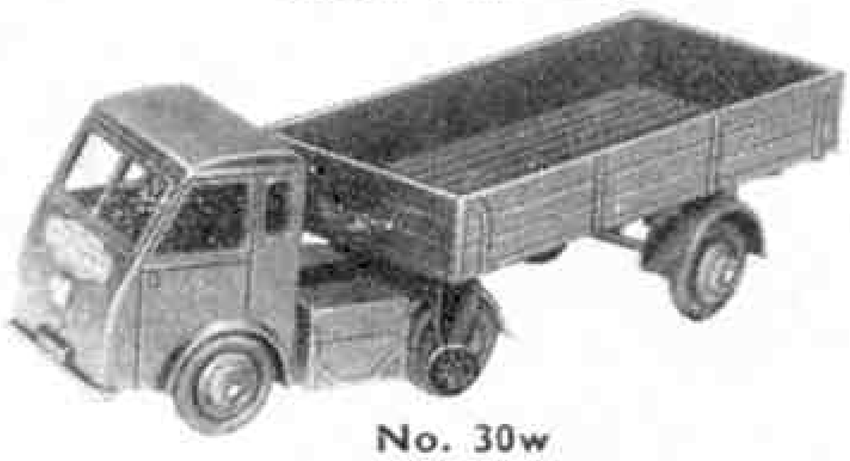
Length 3½ in. **2/8**



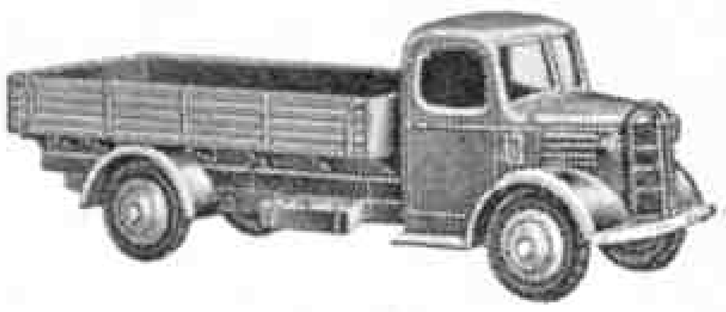
No. 23h
Ferrari Racing Car
Length 4 in. **2/11**

No. 23j
H.W.M. Racing Car
Length 3⅞ in. **2/11**

No. 34c
Loud Speaker Van
Length 3⅛ in. **2/3**



No. 30w
Electric Articulated Lorry
Length 5¼ in. **4/3**

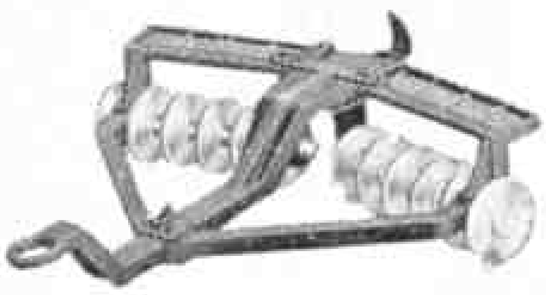


No. 30j
Austin Wagon
Length 4¼ in **2/6**

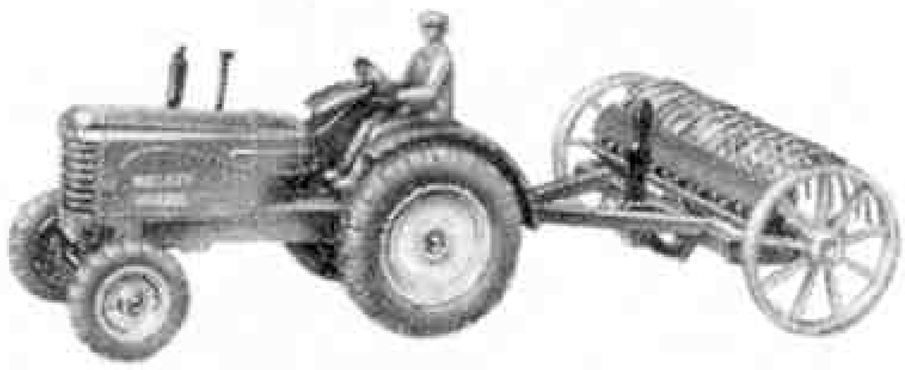
No. 40a
Riley Saloon
Length 3½ in. **2/4**

No. 40d
Austin Devon Saloon
Length 3⅜ in. **2/4**

No. 40f
Hillman Minx Saloon
Length 3½ in. **2/4**

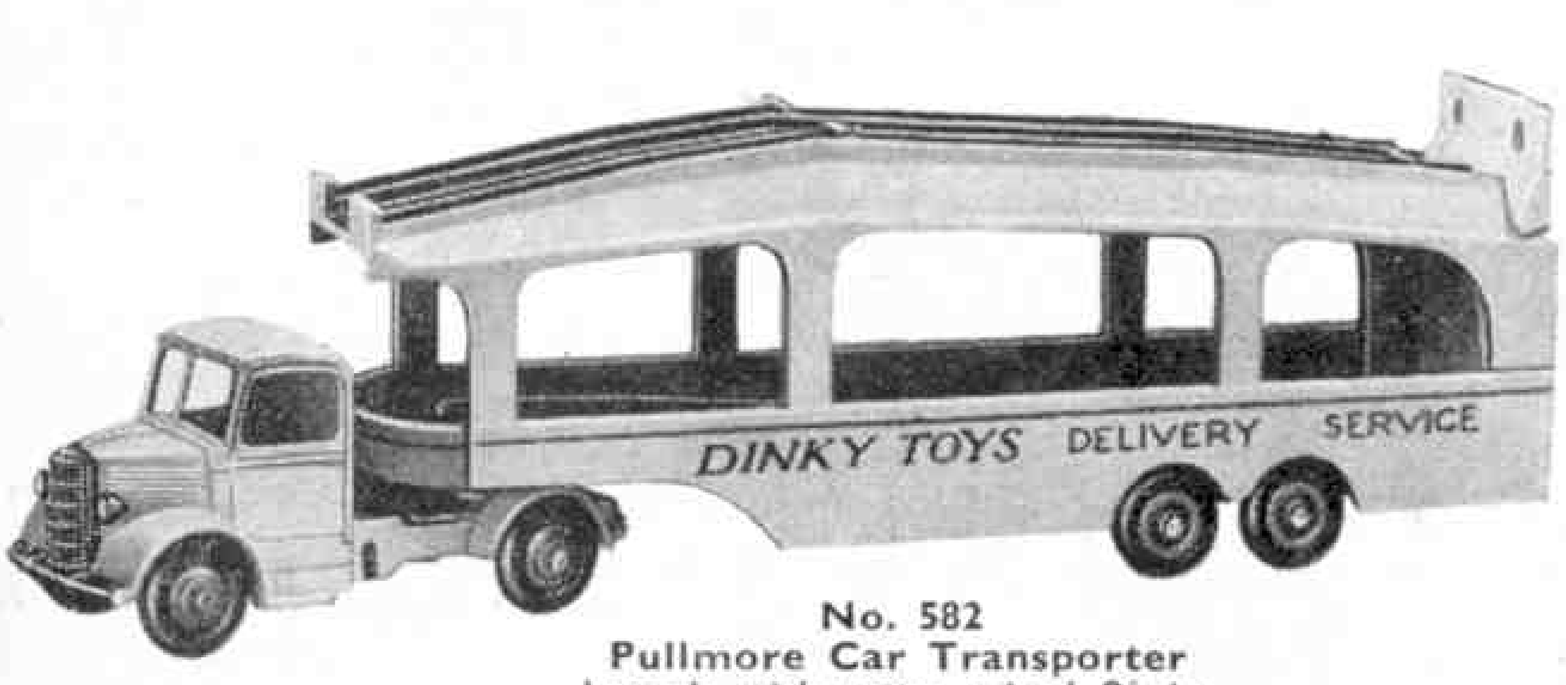


No. 27h
Disc Harrow
Length 3⅜ in. **2/4**



No. 27ak
Farm Tractor and Hay Rake
Length 6 in. **8/2**

No. 27c
Manure Spreader
Length 4¾ in. **4/2**



No. 582
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Length with ramp raised 9⅛ in.
15/9

No. 14c
Coventry Climax
Fork Lift Truck
Length 4¼ in. **7/-**

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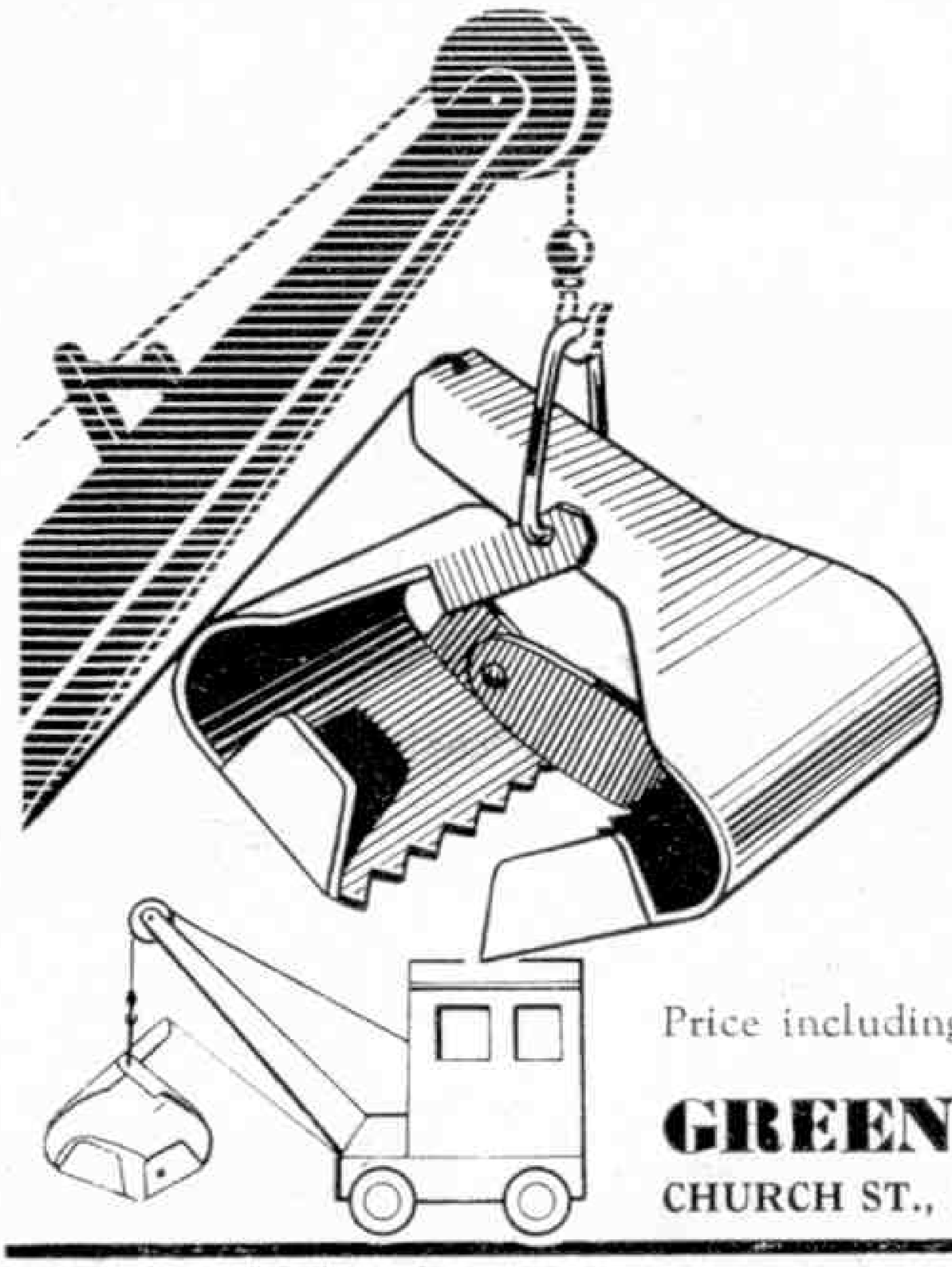

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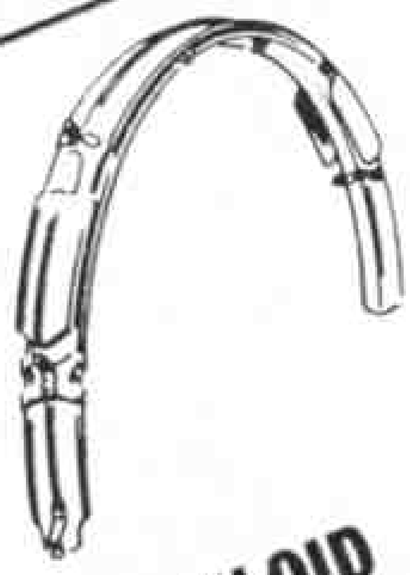

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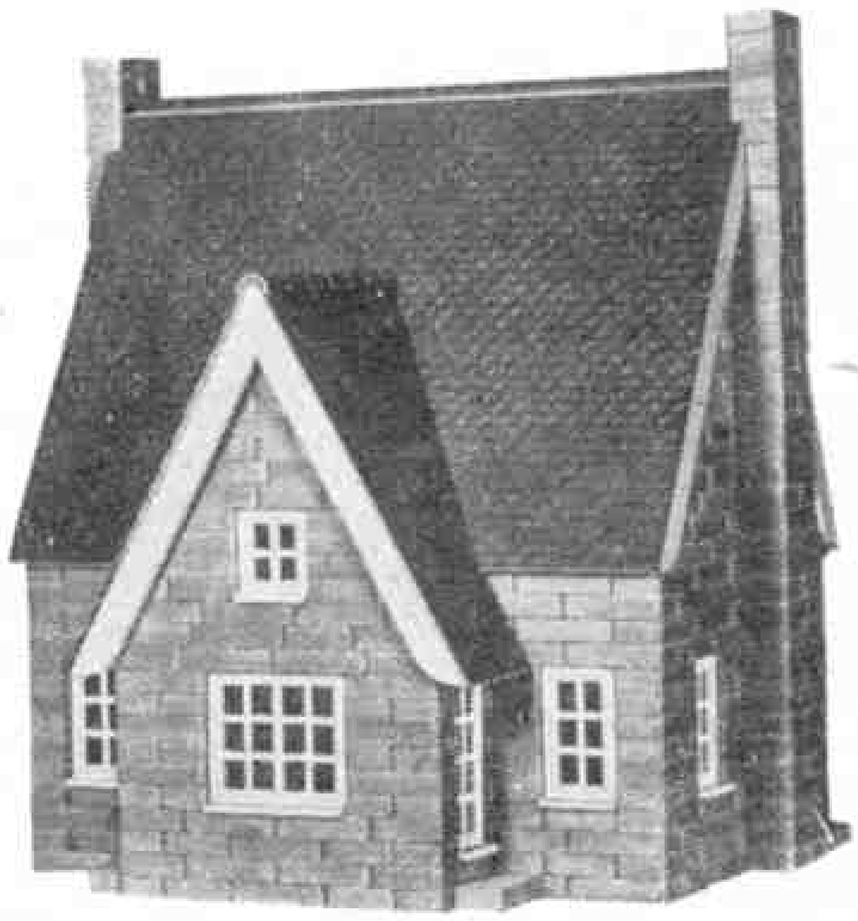

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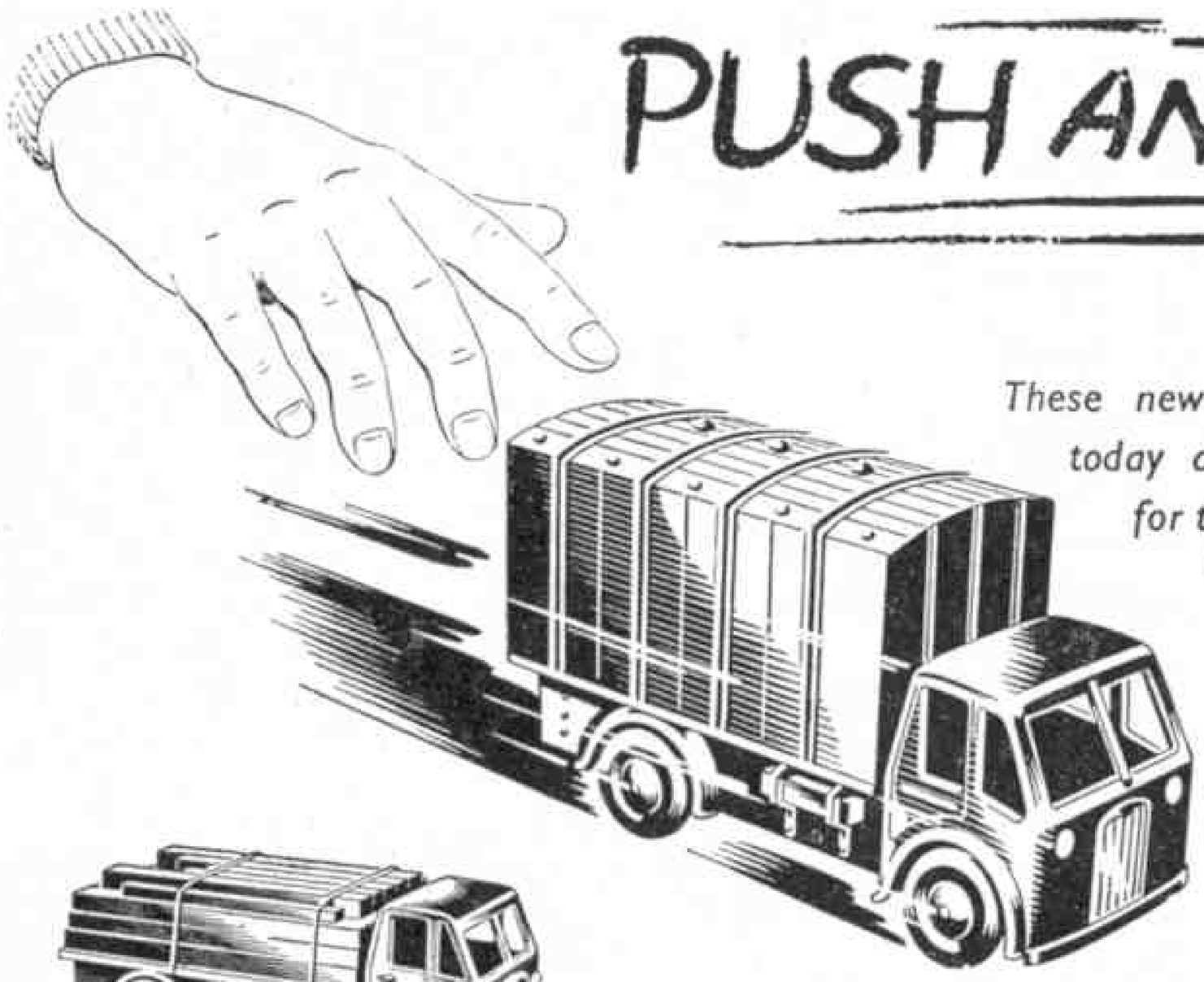

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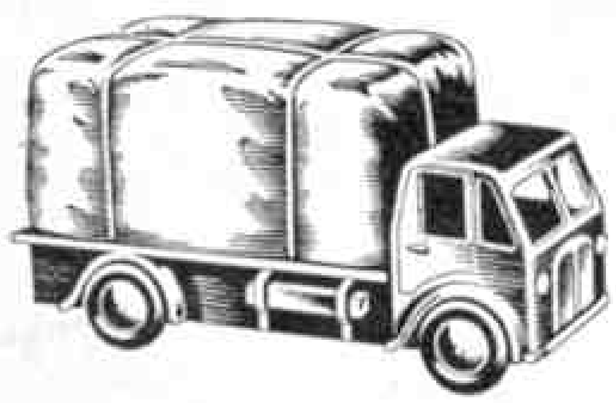

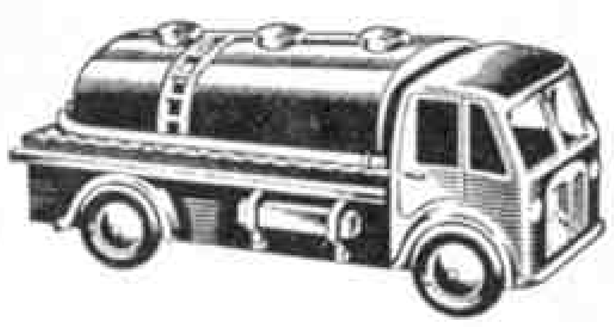

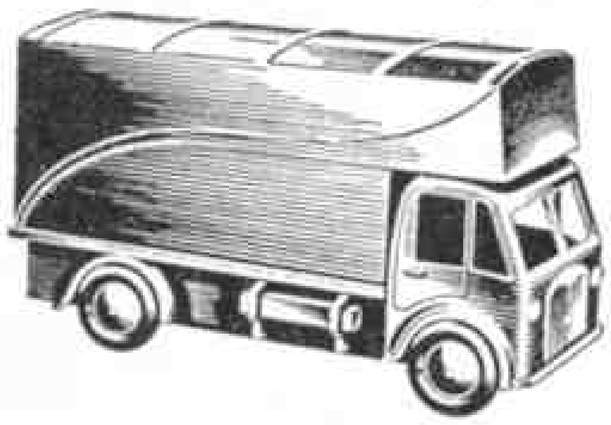

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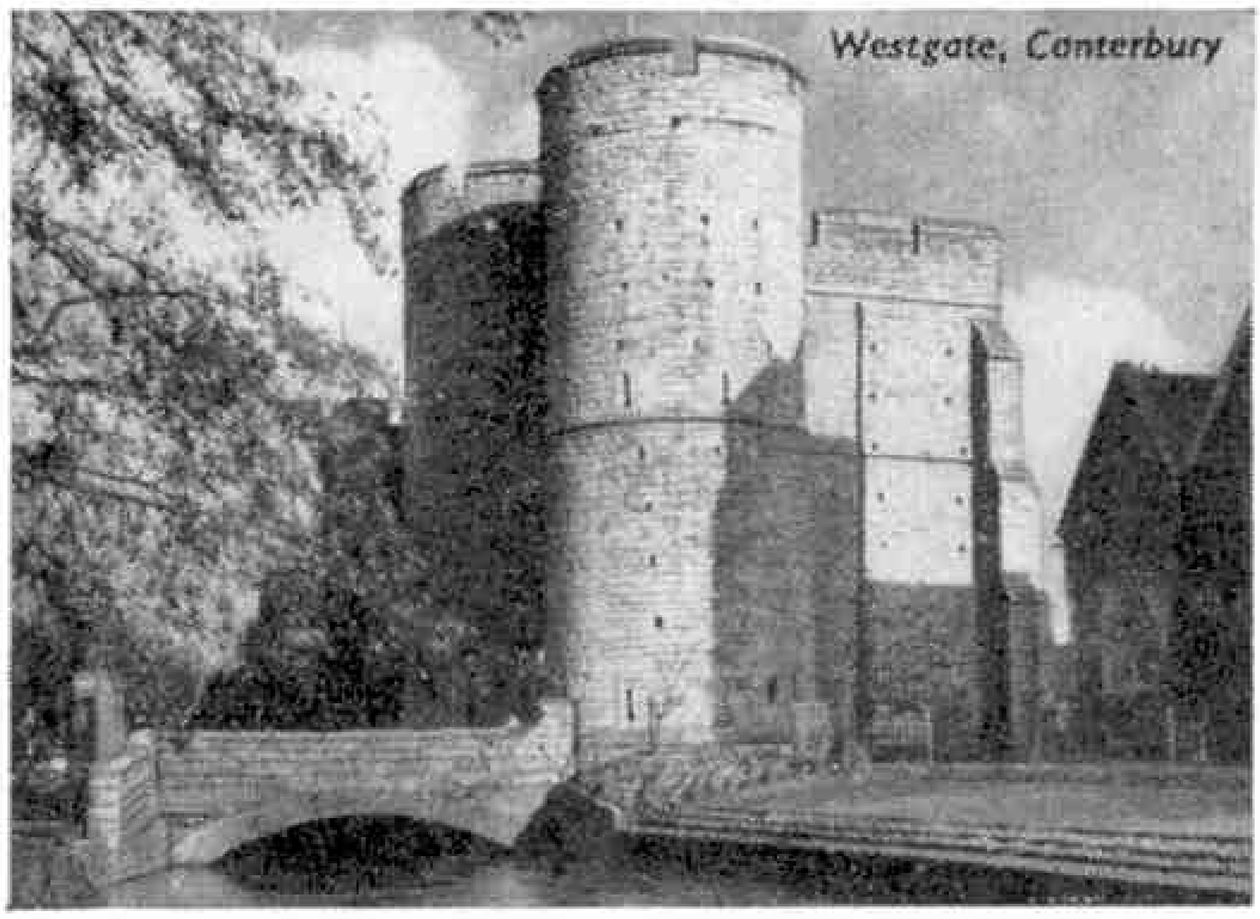

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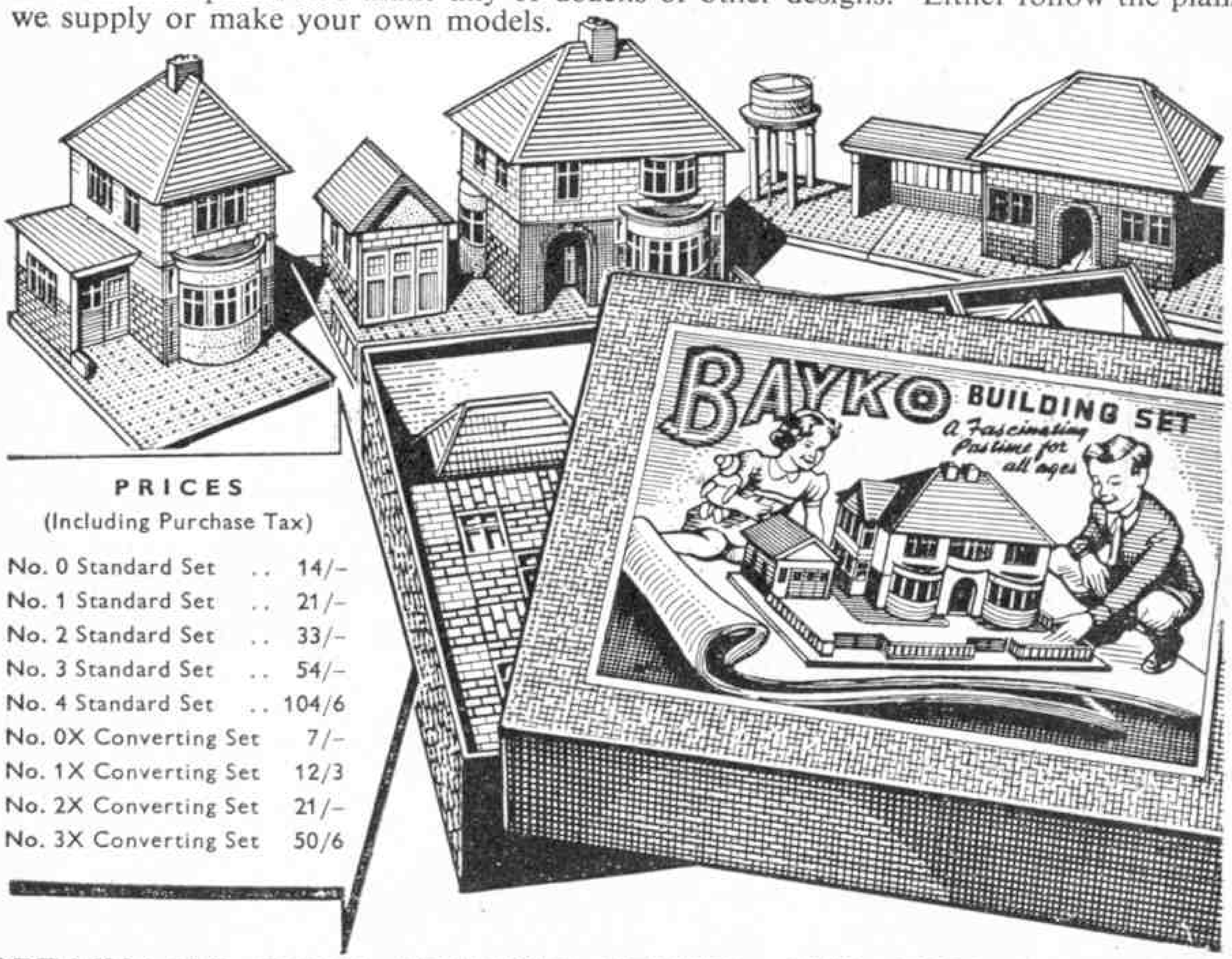

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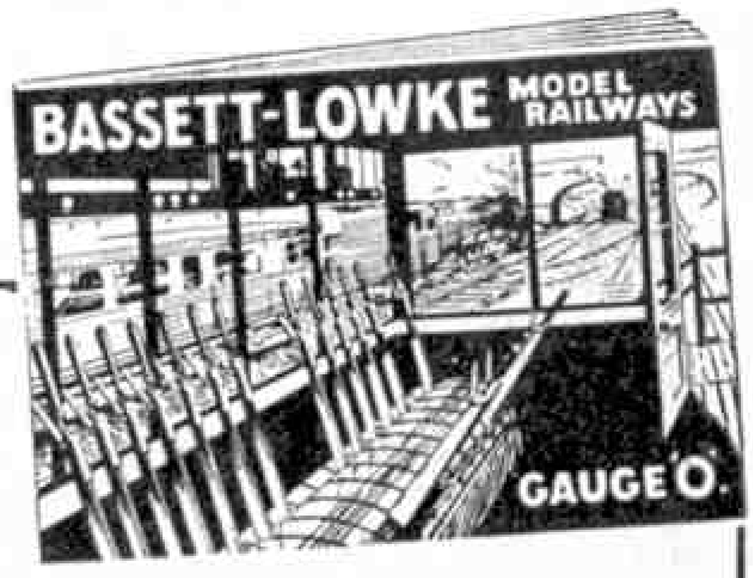

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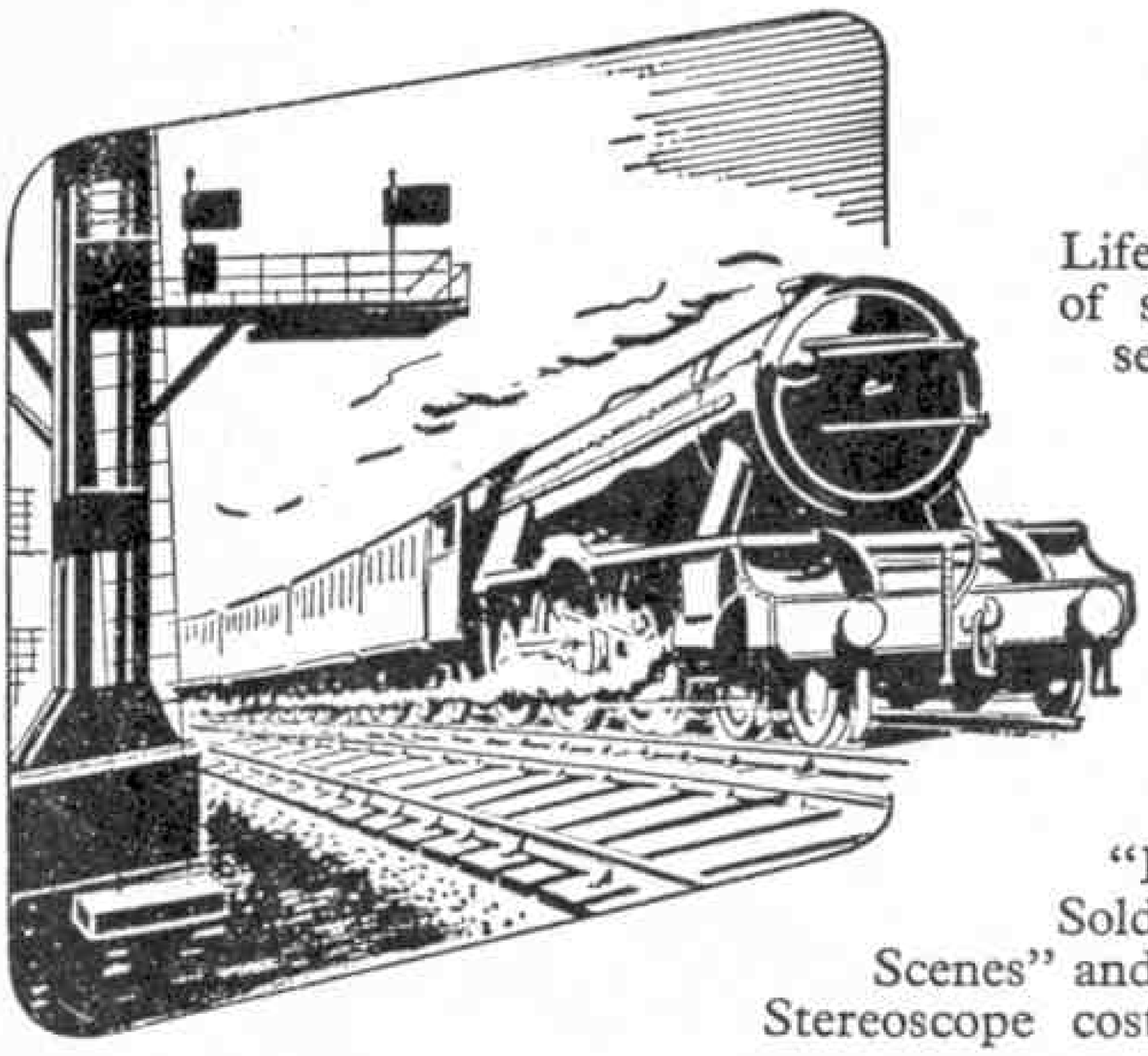

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MECCANO MAGAZINE

Editorial Office:
Binns Road
Liverpool 13
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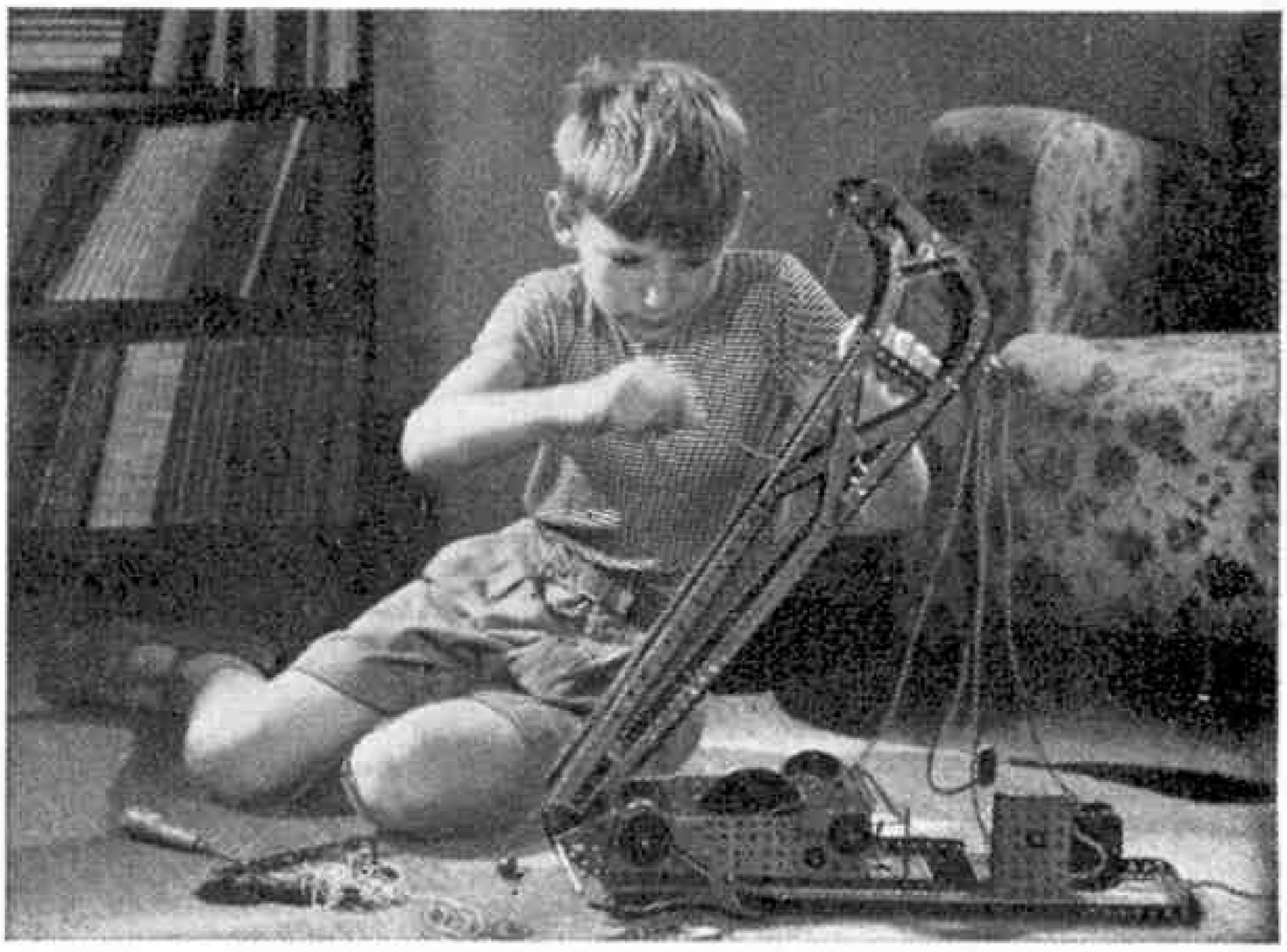
Vol. XXXVIII
No. 6
June 1953

Long Live the Queen!

AT the moment all our thoughts are on the great event of the year, the Coronation of Her Majesty Queen Elizabeth II. The crowning of one of our monarchs is always a wonderful event, and the wonder seems to grow. One reason for this no doubt is the fact that now we can all take part in it. When King George VI was crowned in 1937, all of us who remained in our homes and millions overseas were able for the first time in history to follow the time-honoured ceremony through the medium of radio. This in itself was a wonderful step forward from earlier days, when only the comparative few who had seats in the Abbey itself were able to do this. Today the marvel is increased a hundredfold and more, for millions of us will be able to look right into the Abbey itself.

I am certain that even with the coming of television there will be no lessening of the numbers of those who will throng London's famous processional routes, and that the enthusiasm of those who gather for the purpose of cheering their Queen as she is driven to the Abbey for her Coronation, and back again later to the Palace, will be even greater than on previous occasions of this kind.

Films flown to distant lands at speeds undreamed of in 1937, when George VI was crowned, also will play a part, and with radio will bring pictures and graphic descriptions of the ceremonies and rejoicings to the farthest parts of the Earth. What a contrast from the Coronations of the past, especially those of more than 100 years or so ago, in the days before the coming of railways or steamships, when travel was slow and uncertain and even the most elementary photography unknown. In those days, even a British Coronation could almost be described as a local event; that of our Queen Elizabeth II will be world-wide.



Happy days! This enthusiast is not only enjoying himself, but is also doing a fine job thoroughly. Good work well done is always a source of pleasure and satisfaction.

Now you are all waiting to take part in Coronation duties and festivities, and you will do this gladly with the knowledge that you are honouring a Queen whose wonderful smile has already endeared her to us at home, to all the peoples of the Commonwealth and indeed to the whole civilised world.

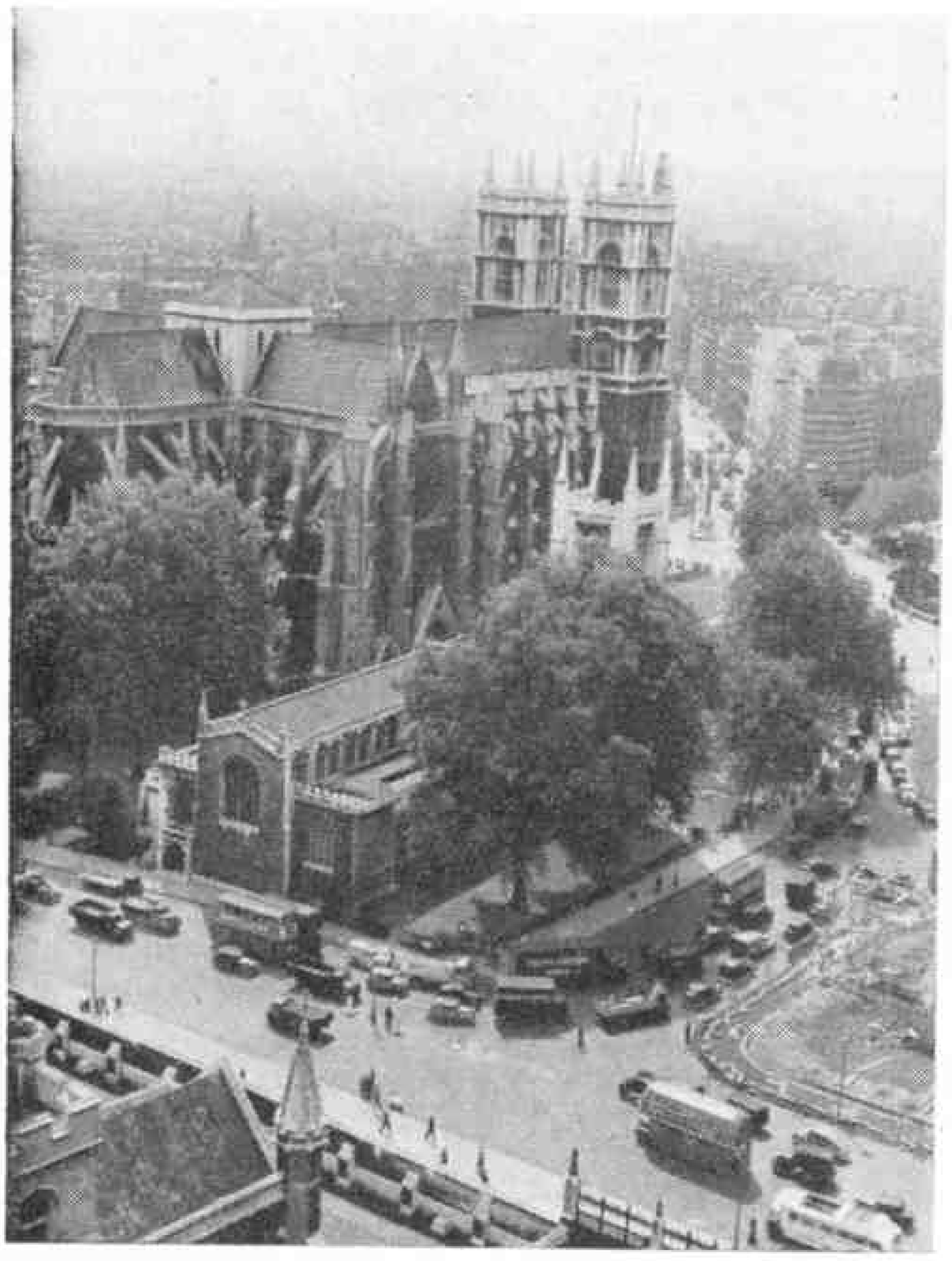
The Editor

The Story of Westminster Abbey

By T. Holloway

ON the day of our beloved Queen's Coronation the eyes of the world will be focused on the great and glorious Abbey of St. Peter at Westminster, the setting for every Coronation save one since the time of Harold, last of the Saxon kings, in 1066.

What is the story of the Abbey, now often referred to as the "Commonwealth's Parish Church?" Tradition alone supplies its earliest records—or, to be more exact, those of the churches that have been raised on the site.



A splendid view of Westminster Abbey, with St. Margaret's Church in front of it. In the foreground part of the Parliament Buildings can be seen.

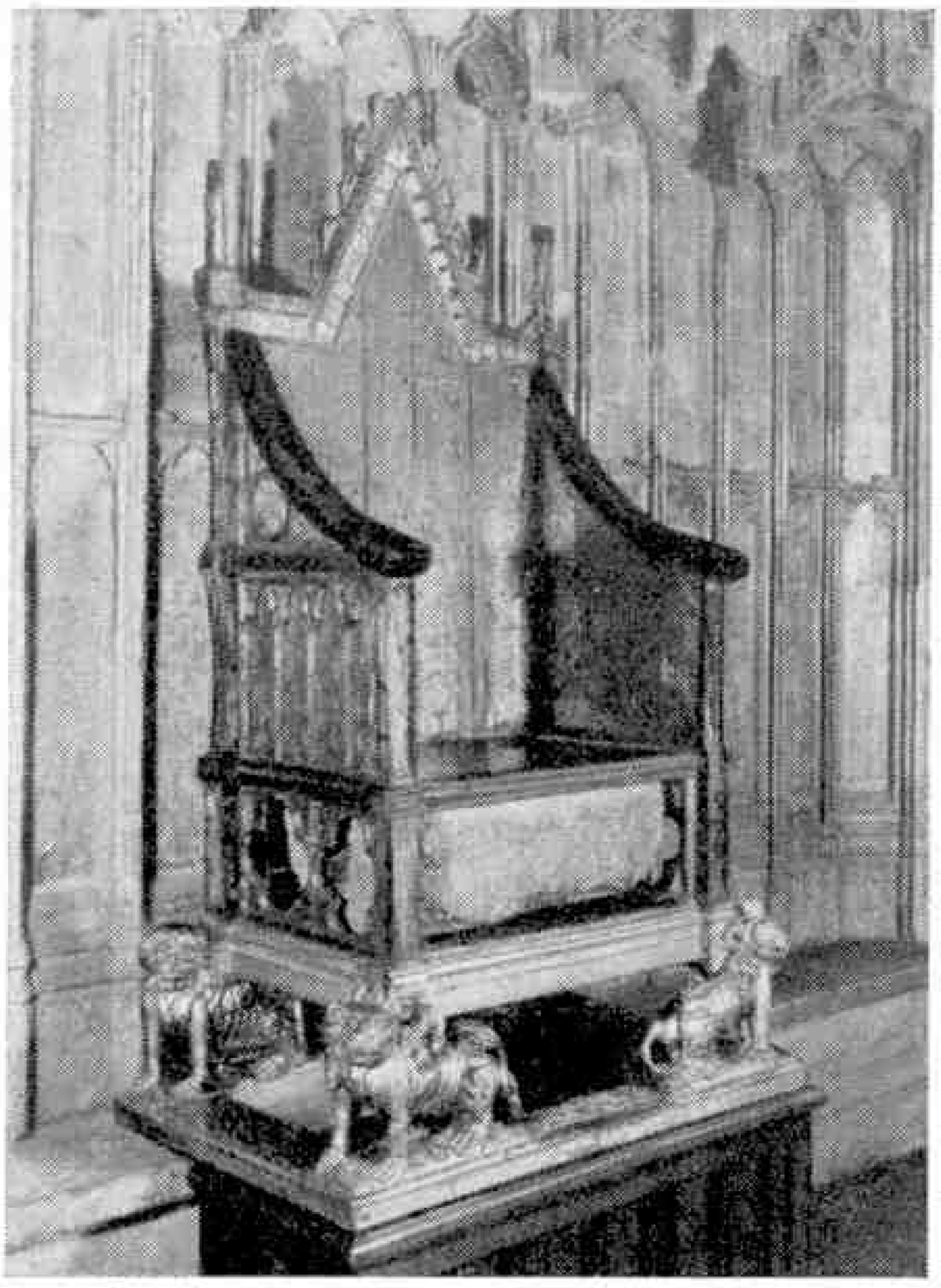
One story refers to a church erected by King Lucius towards the end of the second century, but a later tale ascribes the first church to King Sebert, of the East Saxons, who was converted by St. Augustine about the year A.D. 604. At that time, the site on which the present Abbey now stands was known as Thorney Isle—the Terrible Isle—a waste of marsh and thicket shunned by all save creatures of the wild.

After many years of exile in France, the pious but dreamy Edward the Confessor came to the throne in 1042. Leaving the affairs of State in the hands of his nobles, he devoted his life to the building of a great new church in what was then the latest Norman style. It was begun in 1050 and completed in 1065—only one year before his death and the Norman Conquest. Edward's church was a massive structure, almost as large as the present Abbey, but by the early 13th century it had fallen into a grievous state of disrepair.

Fortunately, King Henry III took matters in hand—for Edward was his most revered saint. But instead of repairing the building, Henry had the greater part of it demolished so that he might raise on the site a finer building in the Early English style that would rival, if not excel, the great French Cathedrals such as Beauvais and Chartres.

History records that "on the sixth day of July, 1245, the new church at Westminster was begun." From the foundations of Edward's church rose up the choir, the transepts and the first five bays of the nave, whose interiors we can see today. In designing this splendid new Abbey, Henry naturally reserved a place of honour for the body of St. Edward. In a chapel raised six feet above the floor, built up on soil specially shipped from the Holy Land, he erected a marble shrine with mosaic in gold and rich colours, and on it placed a golden coffin studded with jewels, gold figures, and bright enamel.

From old records and accounts, we are enabled to visualise the scene as the magnificent building approached its completion. At the quayside close by, barges were arriving from the opposite bank of the Thames laden with huge blocks of Reigate stone, while other small ships were unloading stone from Caen and marble from Corfe. Most of the timbers probably came by way of the river, while lead from Derbyshire and iron from Gloucester are believed to have been carted by road, reaching the Abbey by way of Tothill Street. The two horse



The Coronation Chair, shown in place in the Coronation scene in the illustration below.

wagons, mentioned in the accounts, were probably employed for carting materials from the quayside to the site.

Within the massive building was great activity. Between 50 and 80 carvers and cutters of stone were at work, as well as 40 or 50 marble workers and 20 to 30 carpenters. High up on scaffolds the carvers would be at work, for in mediæval times sculpture was usually wrought at the spot where it would remain when completed. Other masons would be carving capitals and other decorative features in stone on numerous benches around the walls.

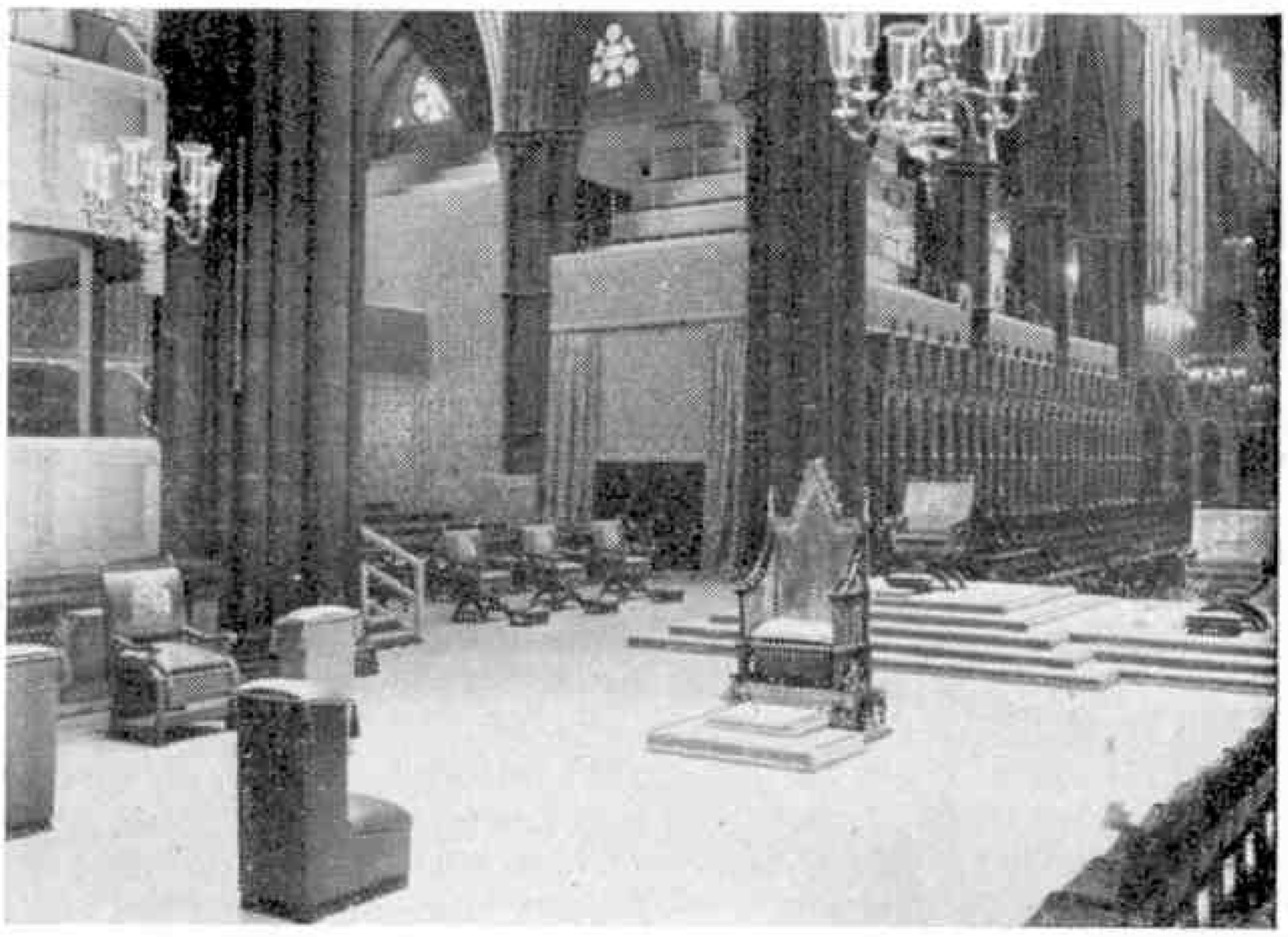
A small army of polishers were working on the marble columns and shafts, whilst Master Peter with many other skilled painters were busy colouring sculptures and working on wall paintings. A succession of celebrated Master Masons are mentioned in the records—Master Henry, John of Gloucester and a great many more.

At this point it is interesting to note that these early builders had little use for detailed plans, and designs were seldom prepared in advance as they are today. The need for them had not arisen. Behind the builders lay centuries of experience and experiment, of which their methods and manner of work were the outcome. As one writer has aptly put it: "Behind was custom, in front adventure."

By 1483 the seven western bays of the nave, part of the cloisters and the deanery—formerly the abbot's house—were completed. The west front, with its great window, was begun in the 15th century by Richard III and finished by Henry VII, who also built the present chapel that bears his name. No major alterations or additions seem to have been made until 1713, when 80-year-old Sir Christopher Wren began raising the two western towers to their height of 225 ft.

The Abbey as it stands today is over 500 ft. long, while the width of the nave is between 70 ft. and 80 ft. and the height of the roof 100 ft. The length of the nave is 166 ft. and the choir 155 ft.

The Abbey has indeed just cause to be called the "Tomb of Kings," for within its ancient walls sleep fourteen kings and ten queens, five of whom were sovereigns. So great is the number of tombs within the Abbey that there is now no room for even the most famous of personages to be



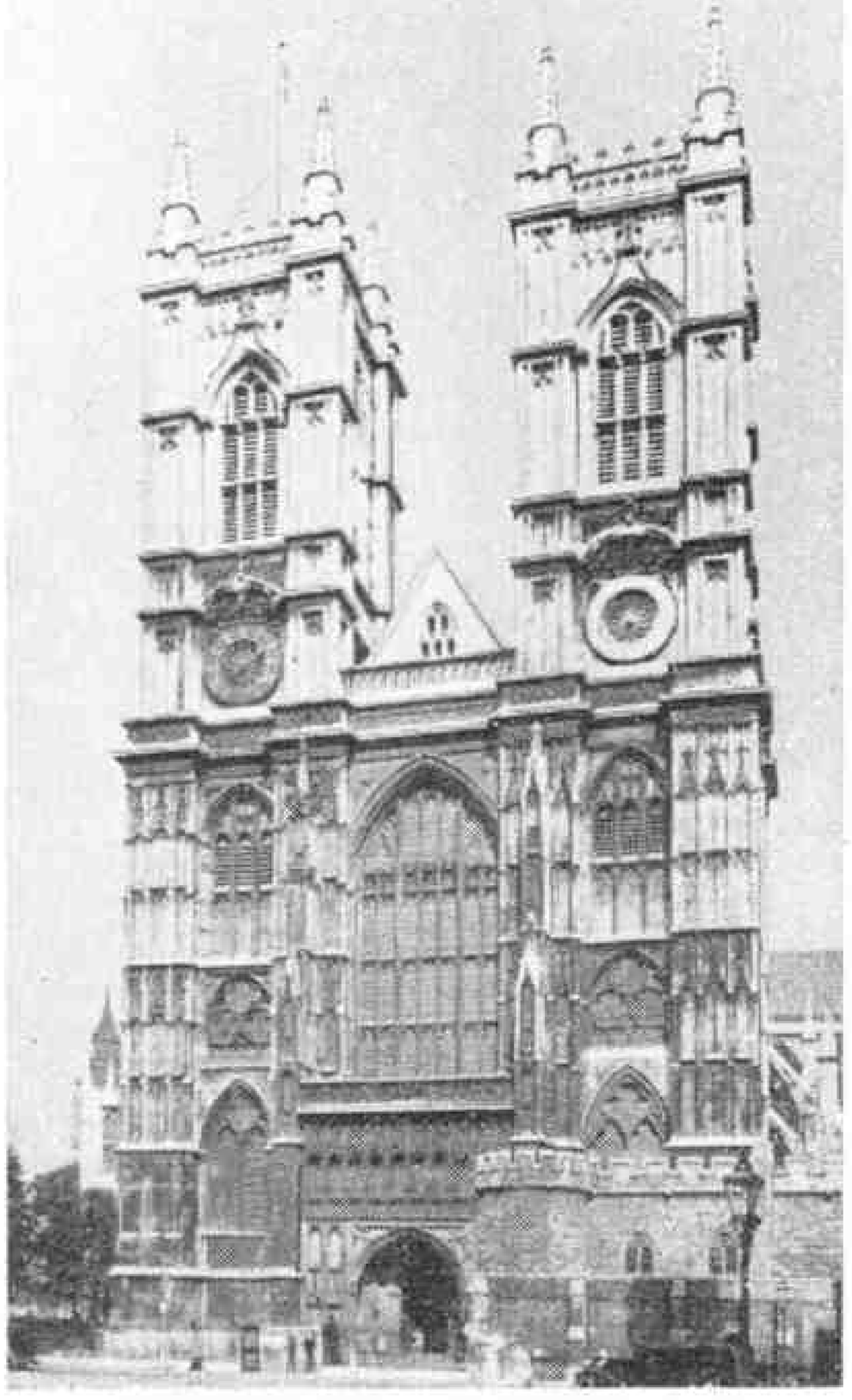
Here is the centre of interest on Coronation Day, for it is in this part of the Abbey that Her Majesty Queen Elizabeth will be crowned. Our photograph shows the setting for the Coronation of George VI and his Queen in 1937.

buried there. The reason for this is chiefly the fact that in days gone by the Abbey was not only a burial place for people of high estate, but for many more lowly folk as well.

Among the latter are a plumber, a laundress, a butler, a barber's daughter and even a murderer and a spy. In the west walk of the cloisters is the tomb of that famous 18th century pugilist and champion fighter of all England, John Broughton. No details of his pugilistic achievements appear on his stone though, for this the Abbey authorities would not permit, and the space allotted for the inscription still remains blank. It was not Broughton's sporting career that won him an Abbey burial, but the fact that he served as a verger for many years. Another interesting tomb is that of Thomas Parr, who died in 1635 with the reputation of being Britain's longest-lived man—his age being given as 152!

It is not surprising that down the centuries thieves and vandals have plagued the Abbey. The jewels, gold and mosaic that formerly adorned St. Edward's shrine were removed by pilgrims and common thieves alike. What ornamentation of value remained was seized during the dissolution of the monasteries. The effigy of Henry V, victor of Agincourt, has lost its armour and head of silver, and numerous other tombs have been plundered and despoiled. In 1914, the Coronation Chair, made to the order of Edward I, was damaged by a small bomb concealed in a handbag.

Among the lesser-known parts of the Abbey is a large upper room or gallery in the south transept, half-way between the floor and the triforium. For more than 500 years this has been the muniment room and in it stand the great wooden chests in which the monks kept their documents. This priceless collection of old records is so vast that it almost defies description. The whole life of a great mediæval monastery is chronicled here, from the Charter of King Offa, giving the first known description of Westminster, to the last hurried, untotalled and unbalanced accounts of the monks on the eve of the Dissolution.



The great west front of Westminster Abbey.

Some of the most interesting documents are those kept by the infirmarer, the brother in charge of the sick and aged monks. His carefully kept records of receipts and payments were written on sheets of vellum, one sheet being sewn on to the next until oftentimes the year's accounts were 9 ft. long! If the accounts were found to be in order, the "auditor" would endorse them *Et sic quietus est*—and so is quit.

On one of these vellum rolls is a payment entry for "White wine for Brother Twyning." It seems that this monk had persuaded the abbot that he needed wine for the sake of his health. The sceptical and indignant infirmarer, however, wrote beside the entry: "Because he is unable to drink beer, so he says!"

Another document tells us of a monk who professed to be grievously ill and remained many months in the infirmary. At last the prior openly declared that he believed the brother was "no more syck than his horse." Upon hearing this the monk called in no fewer than five doctors "which opynly did prove me to be infected with dyvers sycknesse whereof the lest were able to kyll a Ryght strong man!"

And now, once more, the stage is set for a ceremony as moving and colourful as any that have gone before. In what more fitting setting could our youthful and beloved Queen be crowned!

DINKY TOYS

More about the latest models

H.W.M. Racing Car, Dinky Toys No. 23j.

HERE is a picture of the H.W.M. Racing Car, Dinky Toys No. 23j, which appeared last month. The real H.W.M. was designed and constructed by John Heath, partner with the famous racing driver George Abecassis in the firm of Hersham and Walton Motors. Undoubtedly this car is today one of the stars of British motor racing, as Mr. McLintock makes clear in *On the Road* on page 308. It has graceful lines, including a shapely tail, and these features are splendidly produced in the miniature, which in these and other details follows its original so faithfully that it can be recognised at a glance, as is usual with Dinky Toys motor cars, and indeed with every member of the series. Those of you who have already become owners of the Dinky Toys H.W.M. will have realised this, and nobody interested in racing car models, and in Dinky Toys in general, need hesitate to add it to their fleets.

Now let us turn from this fine racing motor car to a remarkable vehicle designed for carrying motor cars. This is the Pullmore Car Transporter, Dinky Toys No. 582. Many readers, particularly those who live near the ports through which British motor cars are sent overseas, must have seen the original of this on the road, and I am sure they will be delighted to find that they can run its miniature on the roads of their own layouts. The vehicle of course is articulated, with room for four cars in and on the trailer, two inside and two on top, and a hinged ramp at the rear up which the cars can be run. All this can readily be seen from the illustration at the foot of the page,which shows the Dinky Toys Car Transporter adapted for use in the Dinky Toys Delivery Service. The actual Pullmore Car Transporter is the product of J. Brockhouse and Co. Ltd.

The appearance of this magnificent model indeed will open up an entirely new field for those owners of Dinky Toys who have built up road layouts on which to run the various passenger cars, lorries and other vehicles of the series. Now they can extend their road services by including the carriage of motor cars to the docks for export. A motor car works in miniature makes a splendid addition to the buildings of a layout, and there should be no difficulty in providing dock facilities, or at least some simple representation of a dock system, so that a delivery service of this kind can be started. This fine Dinky Toy indeed introduces new thrills into the favourite pastime of playing with Dinky Toys, and it is also imposing in appearance and a pleasure to possess.

The Pullmore Car Transporter, Dinky Toys No. 582.

Starting Half-way up the Ladder

By John W. R. Taylor

IN the *Meccano Magazine* of November last I described the sort of flying training you would have to undergo if you had an ambition to fly a Comet, but could not afford to join a civil flying club. The idea was to join the Royal Air Force, start at the bottom of the ladder in a 145 h.p. Chipmunk trainer, like H.R.H. the Duke of Edinburgh, and convert gradually on to more powerful piston-engined aircraft and jets.

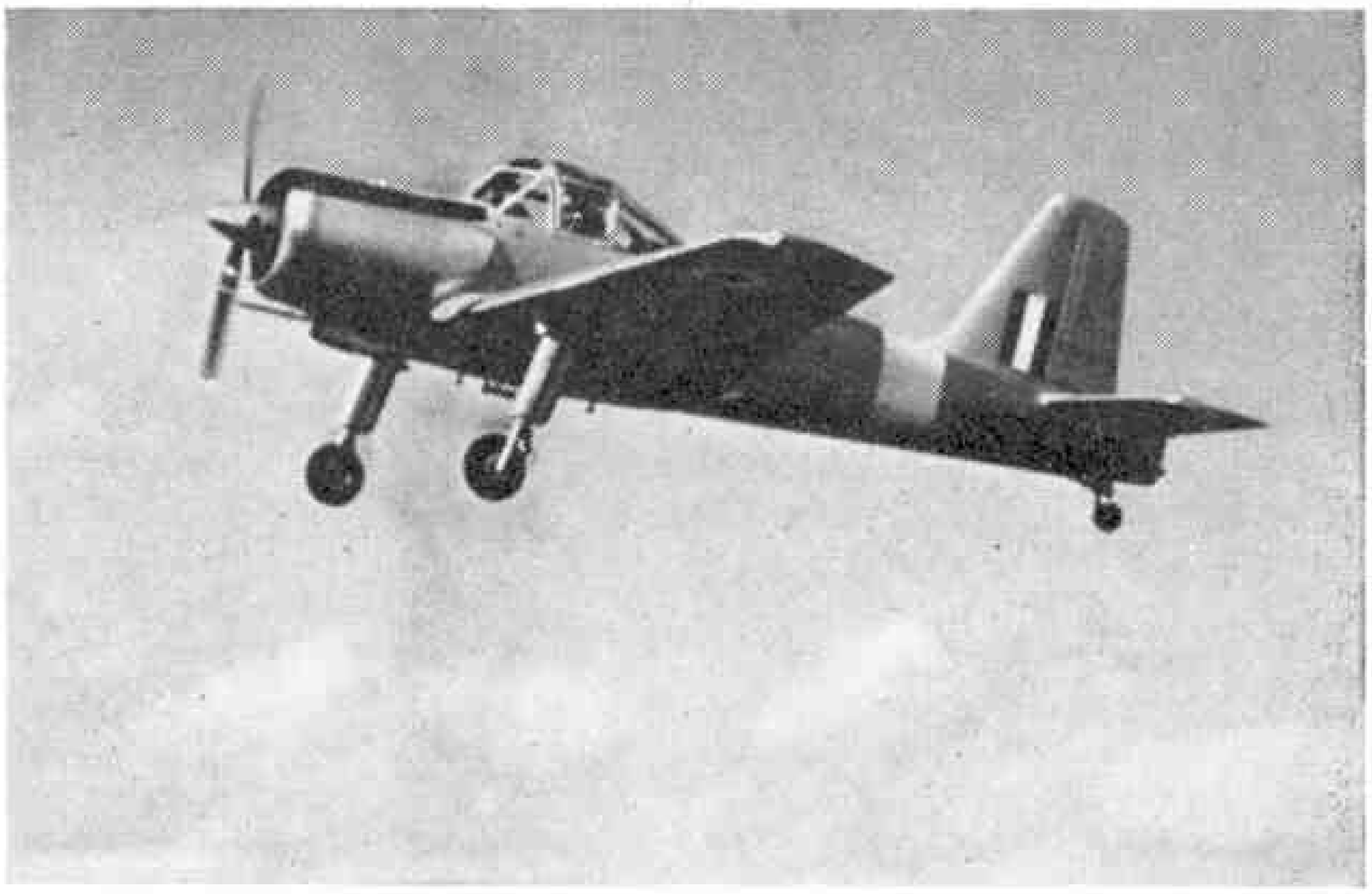
Since then, however, the Air Ministry have been putting a lot of serious thought into this business of training, with some surprising results. The Chipmunks are out—or will be soon—together with the splendid Merlin-powered Balliols, which have been in service only six months.

Instead, all would-be R.A.F. pilots will start their training on 550 h.p. Leonides-powered Percival Provosts, and then pass straight on to Vampire Mk. 11 jet trainers. The first Provost-Vampire school is due to open this Autumn, and as more and more production aircraft become available all R.A.F. flying training schools will be equipped exclusively with these two types of aircraft. Only other types retained for pilot training will be the Varsity and Canberra T.4, for final training of pilots who will fly multi-engined aircraft in Coastal, Bomber or Transport Commands.

The decision to start pupils on a 550 h.p. aeroplane is quite a drastic one—rather like teaching somebody to drive in a racing car. Paradoxically, the U.S.A.F. have just taken a step in the opposite direction by choosing the 225 h.p. Beech T-34A primary trainer to replace their veteran 550 h.p. T-6 Texans (Harvards). But what should be borne in mind is that the Royal Air Force are no longer training men of average physique and skill to fly low-powered aeroplanes. Their new super-priority jet fighters and bombers are complex, expensive, high-performance aircraft, demanding above-average pilots and crews. By cutting out low-powered primary trainers, the Air Ministry believe they will shorten the time required to train a pupil to jet standards; and that unsuitable candidates will be weeded out much more quickly. In both cases, the Treasury will save money, which is always a good thing.

The argument behind all this is quite straightforward. Of all the mysterious qualities which go into the make-up of a successful Service pilot, the most difficult to spot before he begins flying training is "Ability to Split the Attention"—or, in simpler terms, ability to do more than one thing at a time. A fighter pilot, coming in to land in bad weather or after dark, has to fly his aircraft almost by instinct while he watches vital instruments, controls his engine, lowers flaps and undercarriage, talks over the radio, watches for risk of collision with other aircraft and so on. Speeds are so great and things can happen so quickly that he must acquire the habit of doing things instinctively.

Air Ministry experts believed as long ago as 1943 that the best way to find out if a pupil had this ability was to put him in an aeroplane which had as many of the important knobs, levers, dials and gadgets as practical without making it difficult to fly. To give the pupil more confidence and permit the instructor to study his actions



Percival P.56 Provost trainer, powered by 550 h.p. Alvis Leonides engine, now in production for the Royal Air Force.

A fine photograph of a de Havilland Vampire trainer in the air.

more closely, they decided it would be a good thing to sit them side-by-side. The first result, in 1946, was the Percival Prentice, powered by a 251 h.p. Gipsy Queen engine.

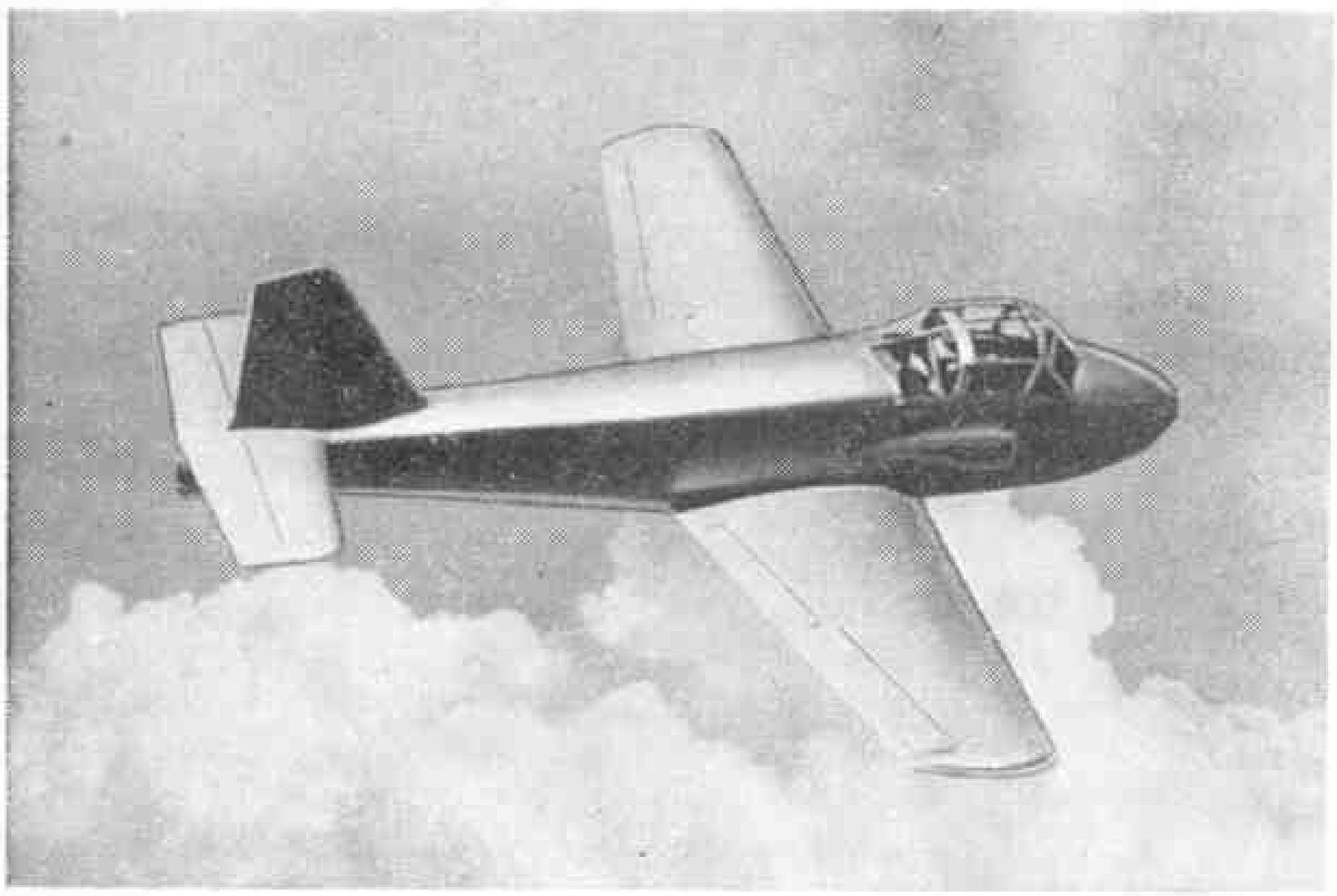
It soon transpired that promising pupils had no more trouble with the Prentice than their elder brothers had had with Tiger Moths. Some failed, as was to be expected, but not in unduly large numbers, and the Air Ministry realised they could afford to go further, by increasing the power as well as the complexity of their basic trainers. So they issued Specification T.16/48, calling for a trainer with an engine of at least 450 h.p. The winning design, selected from about 30 submitted, was again a Percival type, the P.56 Provost, which has been described as the pilot's dream come true, with control response, rate-of-roll and handling qualities reminiscent of the finest fighters. Furthermore, although it is simple and straightforward to fly and land, its lightness of control shows up immediately any ham-handed pilot. So the R.A.F. has every right to feel proud of its new basic trainer.

But, like most modern aeroplanes, however good, the Provost has been superseded on the drawing board by something better, even before it is in service. Chief difference is that, in this case, the "something better" is basically the same airframe, fitted with a 1,575 lb. thrust Armstrong Siddeley Viper turbojet instead of a Leonides piston engine. This "jet-Provost" will, therefore, make even more appropriate the analogy of "learning to drive in a racing car"; but it is a logical consequence of the success of the Prentice and Provost.

Major headache of present-day R.A.F. instructors is to persuade pupils that there is nothing difficult or dangerous about flying a jet 'plane. Some promising young pupils become so worried at the prospect of converting on to jets that they have to be "failed" after as much as 200 hrs. faultless flying on piston-engined trainers.

The others invariably find that they have to unlearn a lot of habits and techniques that have become instinctive with piston engines. They no longer have propeller drag to help slow their landing, or the rapid acceleration that results from ramming forward the throttle of a piston engine; and they have a completely different set of engine instruments to watch. On the other hand, they find jets easier to fly in some respects. In

(*Continued on page 330*)



Model of a future Percival trainer, the jet-Provost. Photograph by courtesy of Percival Aircraft Ltd.

Lead Mining in Derbyshire

By Frank Rodgers

TO begin an article with a list of names of old mines such as *Adventure, Good Luck, Dream, Hazard* and *Silence* would almost certainly conjure up mental pictures of gold mining in the frozen Yukon. These names, however, and dozens similar, were given to the many lead mines still to be found in Derbyshire. The comparison of gold mining with lead mining does not end with the romantic similarity of names, for in both the methods of digging the ore from the rocks, the perils and the crude harsh justice of the miners' laws have much in common.

Although lead was used cleverly by the Ancient Egyptians over 5,000 years ago, its use in Europe is not proved before the late Bronze Age. It is reasonable to assume that Derbyshire was one of the first places where lead was found in England, and there is no doubt that the Romans exploited the area in a really methodical way. The rocky surfaces of the hills would attract attention, and in the Matlock and Wirksworth districts several pigs of lead have been found bearing Roman inscriptions, the Emperor's name testifying that they were cast about 100 A.D.

Throughout the Middle Ages lead was in great demand for roofing and cisterns, etc., and the records show that the Christian centre at Repton in the south of Derbyshire supplied monasteries all over England, the lead being taken as rent from its lands in the Peak. The large area of the Lower Peak became the King's Field and the payment of a tithe of lead to the king gave in return to the miners the right to take any timber needed for the mines, or for smelting purposes. The Derbyshire hills thus became deforested, and the bare landscapes so typical of the county bear testimony to the wholesale use of wood for this purpose.

The actual digging for lead has always been a dangerous task, with rich rewards for the lucky ones. In one narrow vein near Matlock a huge mass of lead-bearing ore 120 feet long by 50 feet deep yielded a profit of £12,000, an enormous sum a few hundred years ago. It was inevitable that lives were lost in the bowels of the earth, for men searched alone or in very small groups just as the searchers for gold did in the wilds of North America.

The fluorspar that contains lead, and indeed gold and silver also in small proportions, lies in three particular positions in the earth. The mining of "flat work," which lies near the surface, has left the hills disrupted and covered with hillocks of worthless stuff. Many deep, narrow gorges in the rock can be traced for miles over hill and dale, and show where a vertical vein known as a "rake" has been worked. Where such a vein dips into the earth it becomes a "pipe" vein.

This view near Wirksworth shows typical Derbyshire lead mining country.

Almost every year adventurous persons become lost or buried in the maze of underground workings left by the miners. Hundreds of small shafts were sunk in the search for veins, and today many of these lie almost hidden in the grass, no longer protected by the cairns of stones once covering them. For this we must thank irresponsible people who cannot resist hearing a boulder crashing into unknown depths!

For centuries hardy men and women picked, crushed and panned the Derbyshire

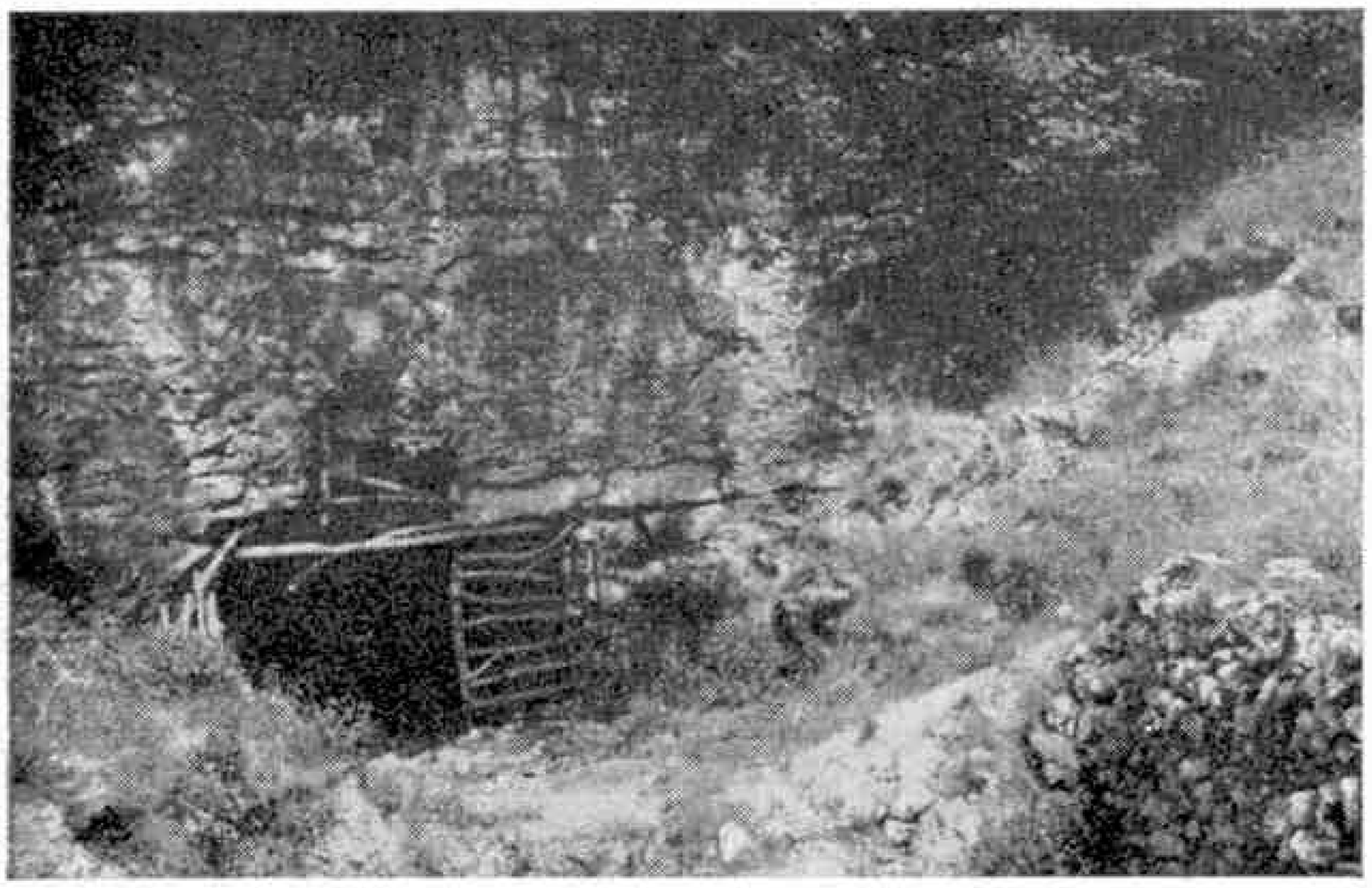
stone, using crude tools and developing in themselves a character in keeping with the lonely, silent places in which they worked. Yet they were not completely independent, and they had the vision to frame a code of conduct for the benefit of all. As long ago as 1288 an inquisition sat with the intention of setting the "ancient custom of the mine," and at Wirksworth was built the Moothall, where the laws were administered, disputes settled, tithes collected for king and church, and even inquests held on deaths in the mines. Many of the laws are still in existence, and even today anyone may prospect for lead anywhere in the King's Field with the exception of churchyards, gardens and orchards.

When a strike was made a right of way was granted to the highway and a cross erected over the mine. Within three days this was replaced with a "stow," this being a wooden windlass for lifting the ore. A grim note may be added here in the form of a verse from a poem on the mining laws concerning theft of ore:

But the third time that he commit such theft,
Shall have a knife struck through his hand to the haft
Into the stow, and there till death shall stand,
Or loose himself by cutting 'loose his hand.

This was typical of the hardy, pugnacious men of the peak.

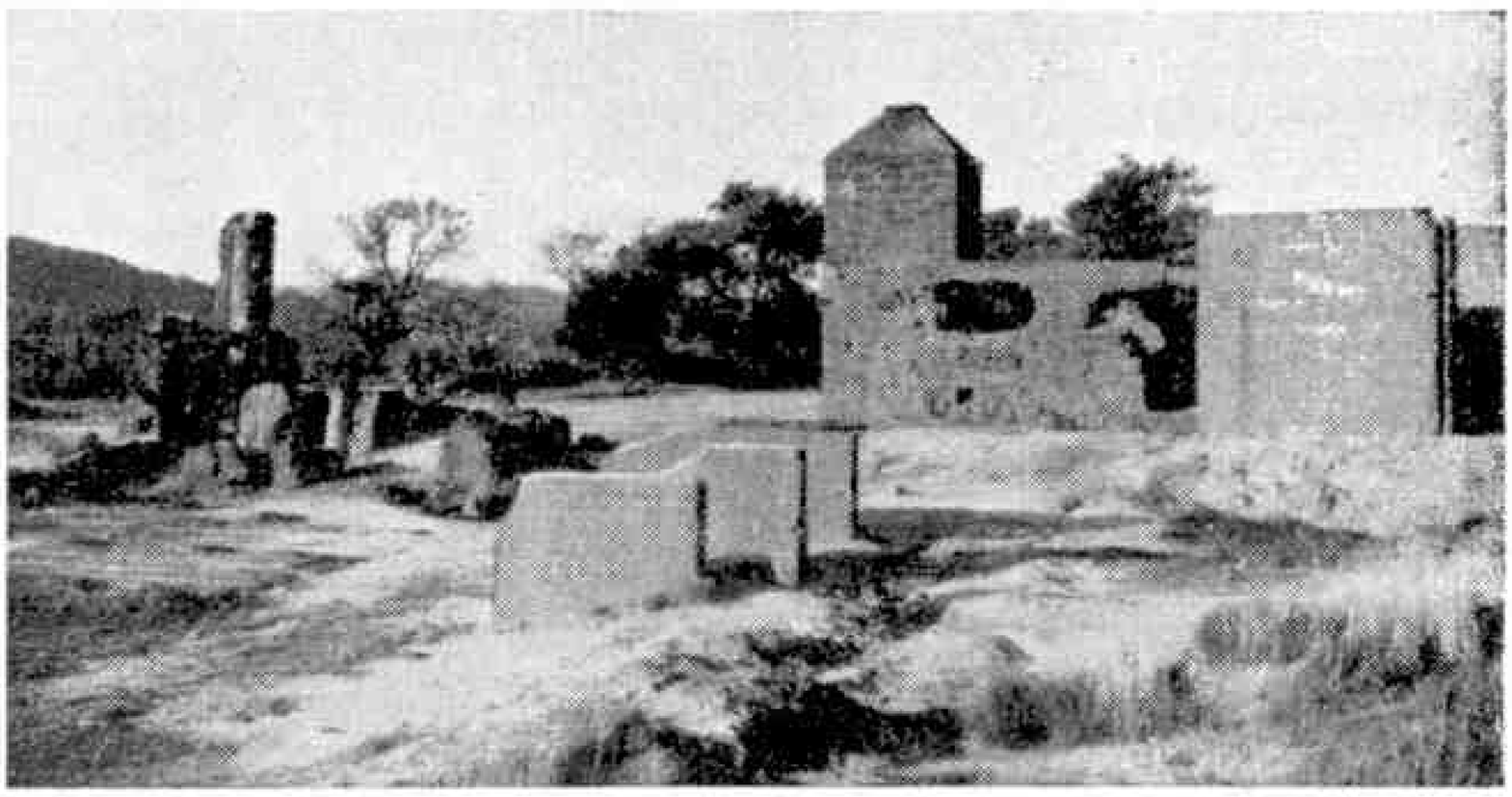
Gradually the small mine ran out as the lead near the surface became exhausted, and the expense of cutting and draining deeper mines led to the splitting of shares into hundredths. At Castleton, the Speedwell Mine was perhaps the most venturesome effort made, for it took 11 years to cut. It cost £14,000 and 11,000 pounds of powder were needed for blasting. It is cut into the side of the Winnats Pass, and became flooded when the tunnel broke into a huge cavern now known as the Bottomless Pit. The intrepid miners then used the 750 yards long tunnel as a canal, bridged the chasm, and pressed on beyond. Only £3,000 worth of lead was their reward.



Entrance to one of the many drift mines with which the lower Peak is riddled.

Some shafts were sunk nearly 1,000 feet and drains were cut to the River Derwent. Even with the advent of the financiers the court at Wirksworth still held power, seizing ore for non-payment of wages and dispossessing owners who tried to raise prices by holding lead. The court indeed still settles disputes today.

The influx of cheaper lead from abroad led to the decline of mining in Derbyshire, but a new venture is being made and borings have been reported as "encouraging."



The ruins of the buildings of an extensive lead mine near Wirksworth. The square tower was the chimney of the smelting furnace.

The author of this article in the B.B.C. Lime Grove studios introducing Hawk moth caterpillars to a television audience.

The Miracle of Insect Transformations

By L. Hugh Newman, F.R.E.S.

THE transformation of insects from lowly crawling grubs and caterpillars to winged and often very beautiful creatures is one of the greatest mysteries of Nature. Even today, after long years of research and careful observation by scientists all over the world, nobody can yet explain exactly what chemical changes go on inside the pupa case of a butterfly or moth, once the caterpillar has cast its last skin. What we do know, however, is that certain cells in the body of the caterpillar already carry the germ as it were of wings and other organs which only appear in the adult insect. These cells remain intact, while the rest of the body breaks down into a fluid, and from this the complicated organs of the imago are gradually built up again. A noted Swiss entomologist, Dr. J. H. Meyer, whom I recently visited in Zurich, claims that a high proportion of this fluid can be withdrawn artificially and replaced by a saline solution without in any way upsetting the metamorphosis of the insect.

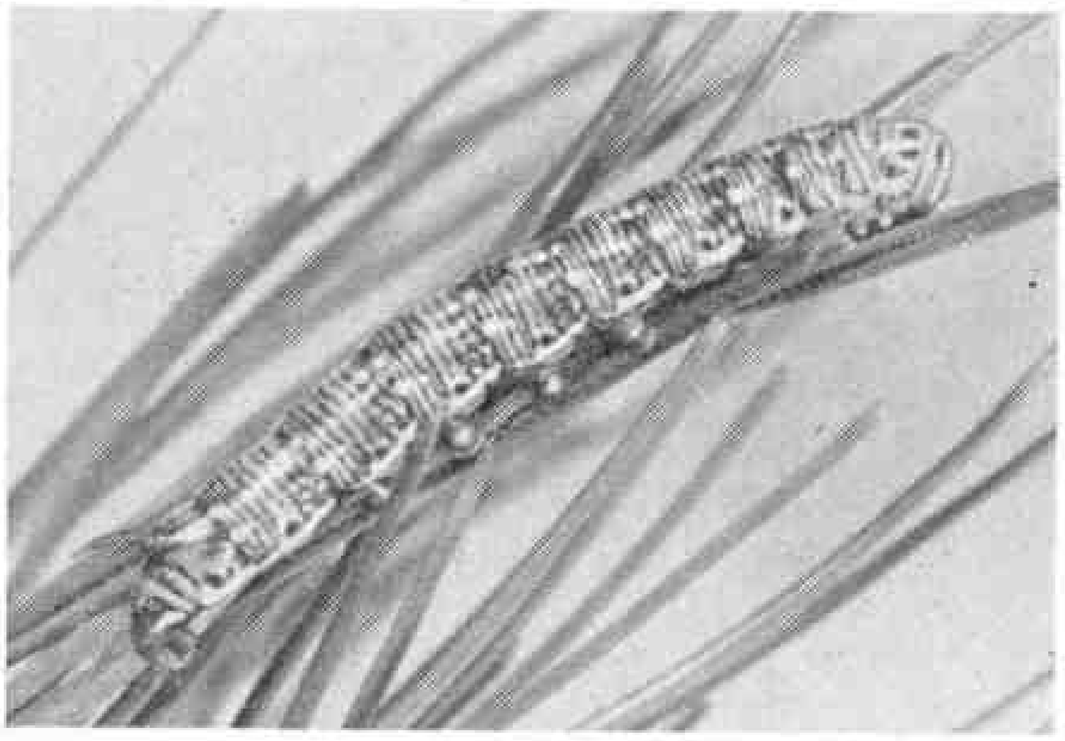
Another remarkable thing about the life history of insects is that the length of time required for each stage of development to be completed can vary within enormously wide limits in the same species. Summer butterflies complete their entire life cycle sometimes in as little as just over a month, while the winter pupae of the same species lie dormant for seven months or more. Certain moths sometimes "lie over" from one year to the next, or even for a period of up to three years, and nobody knows why this should happen, although obviously it is of great benefit to the species as it spreads the chance of survival over more than one season.

Butterflies and moths lay eggs that differ greatly in shape and size, and they may be laid singly or in batches. Quite often they are placed into position with mathematical regularity. The White Admiral lays an egg rather like a sea urchin in miniature; other butterflies produce round eggs like tiny billiard balls, ribbed cones, inverted pudding basins or honey-combed blancmanges. The similarity between certain butterfly eggs and seeds is also very striking, and important from the point of view of camouflage. Among the moths, most of the hawks deposit eggs like translucent seed pearls and the Lappet moth lays large numbers that under a magnifying glass look like marbles.

In due course these eggs hatch into tiny caterpillars and it is very seldom indeed that these "juveniles" bear any resemblance whatsoever to their parents. Even the colouring is usually entirely different. The common Currant moth is one of the few exceptions to this rule, as the black, white and yellow "warning colours" of the imago, or mature insect, are found also in the caterpillar.

Larvæ of both butterflies and moths

The larva that changes to the splendid moth seen opposite to it on the next page.



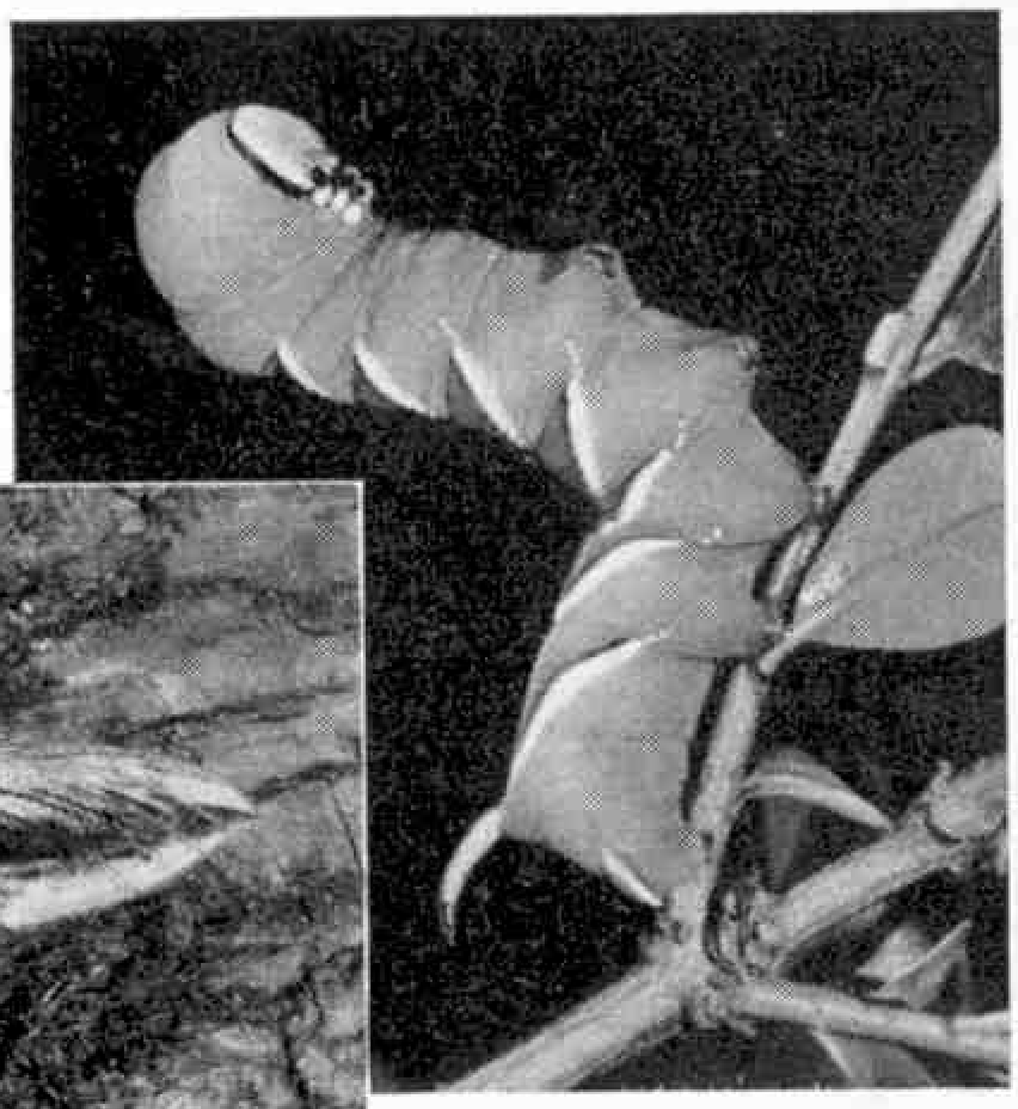
show an extraordinary variation. They may be entirely smooth, or clothed in a dense coat of hair, which may be short or long and is sometimes parted neatly down the middle of the back or swept sideways as if by a barber's brush. Some have thick shaving-brush-like tufts at intervals along their bodies; others produce little raised fleshy lumps known as tubercles.

Some hairless caterpillars are smooth and satiny to the touch while others have a rough surface.

There are caterpillars so uniform and even in shape that the separate body segments are hardly distinguishable, and others that show the divisions so clearly that they remind one of the armour-plated woodlice, while others have the most extraordinary humps in different places. The hawk moths, with two exceptions, have a stiff curved horn on the last segment, and the Lappet moth caterpillar has lappets or flanges of skin that cover its legs on either side of the body. Some caterpillars, like those of the Swallowtail and Puss moths, can produce scent organs and thread-like whips at will from their bodies, and the extraordinary caterpillar of the Lobster moth has front legs that are reminiscent of the huge claws of a crustacean.

The Pine Hawk moth is rather rare and local. This specimen was photographed near Bournemouth.

Below is a Privet Hawk moth, with its larva on the right.



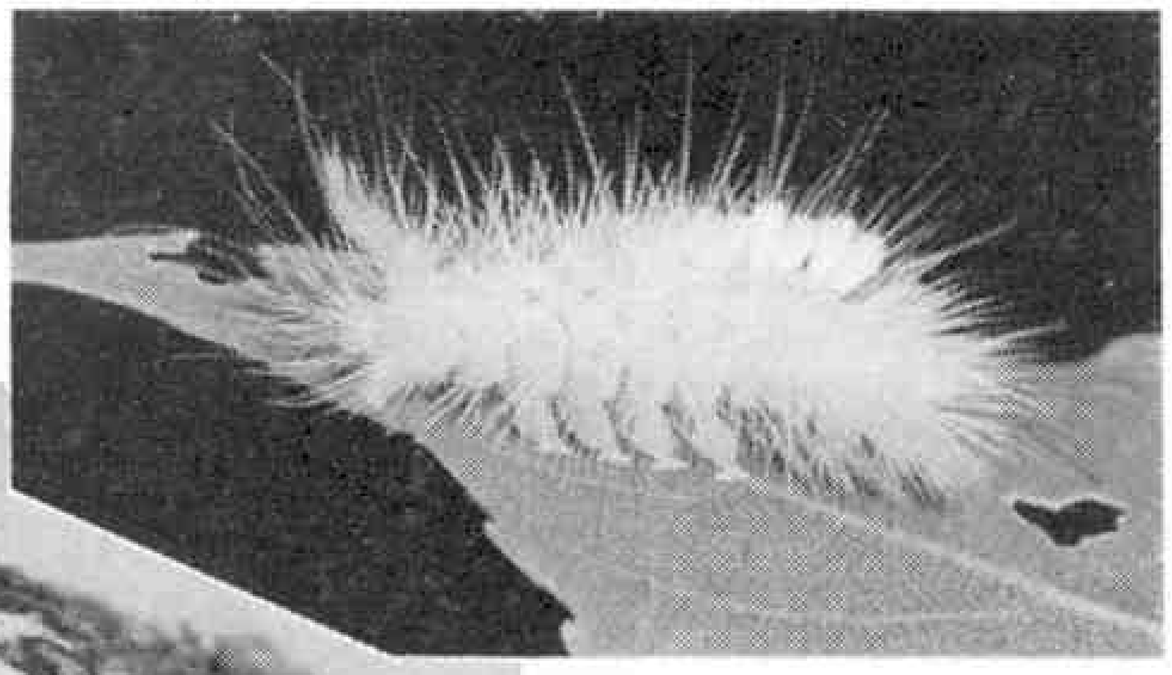
The stick caterpillars are naturally camouflaged to resemble twigs, complete with buds and leaf scars, and the Essex Emerald clothes itself in scraps of its food plant to avoid detection.

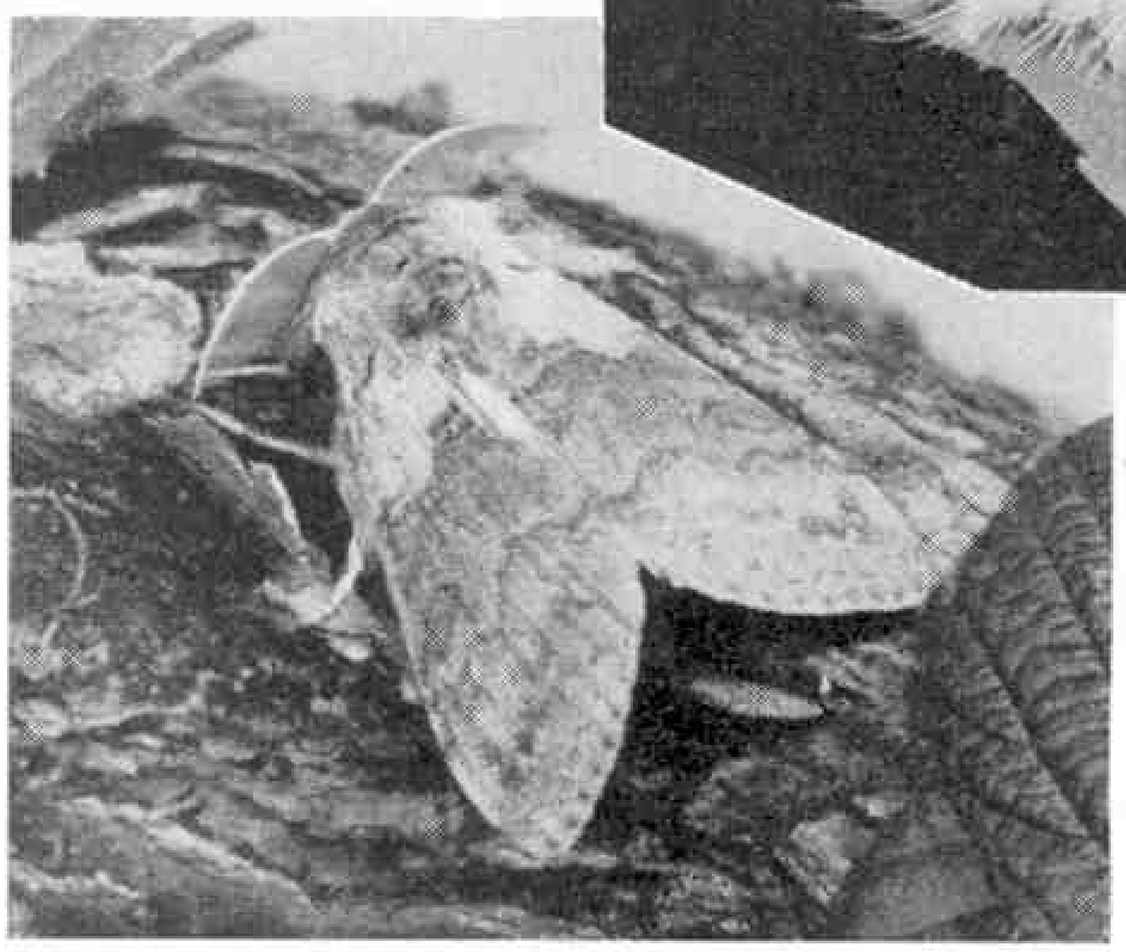
The variation in colour is perhaps even more surprising, ranging from the creamy white of those moth larvæ that feed inside the stems of plants or on the solid wood of trees, to the near-black of the looper caterpillars of the Brindled Beauty. Green is a common colour in larvæ, and mostly derived from the chlorophyll of the plants on which they feed. Few of them are just plain green however. They are nearly always shaded so as to give them a protective colouring, or else diagonal lines run at intervals across the body to break up the shape or there are lengthways stripes of contrasting colours.

There are many shades of brown and grey, often delightfully mottled or intricately marked to give a sort of harlequin effect, as in the Chamomile shark. This attractive caterpillar eventually produces a rather dull brown and cream moth. Besides the Currant moth already mentioned, the Cinnabar and the Swallowtail both exhibit warning colours, the latter in very vivid stripes of black, green and orange. It is however amongst the hairy caterpillars that the most startling colour combinations appear. The Vapourer larva is grey, yellow, scarlet and black and the Grey Dagger, bright

in slate blue and yellow, changes into a very dull grey moth.

Sometimes caterpillars are very variable, and may be found in many different shades of colour. The Pale Tussock would win the first prize in a beauty competition for caterpillars! There are four distinct colour forms of this handsome caterpillar; it may be yellow mottled with green or green mottled with whitish hairs, and both these types are decorated with magnificent tufts of yellow hair arranged like shaving-brushes all down their backs. The other two forms are equally striking; they are either light or dark brown, and the tufts of hair are greyish tinged with pink. These caterpillars were formerly found commonly in the Kentish hop gardens; in fact a popular name for the moth was the Hop Dog. With modern methods of spraying they are seldom seen there nowadays, but as they feed on various trees, including birches, oaks, and limes as well as wild hops, they may be met with almost anywhere.





The larva of the Pale Tussock moth, seen above, is one of the beauties of the caterpillar world. The moth into which it is transformed is seen on the left.

Among the "woolly bear" caterpillars the Tiger moths are the most beautiful, both as larvæ and later in their vivid colours of scarlet, ruby, blue, yellow and cream. The White Ermine moth, very well named, as its white, black spotted wings are reminiscent of ermine fur, also has a richly furred dark brown caterpillar with a red line down the back, and is often found in gardens and crawling on suburban pavements in late summer and early autumn.

In the last few hours of caterpillar existence there is often a strong indication that a transformation is about to take place. The great Privet Hawk larva loses its fresh green colour and gradually fades into a shade of brown much like that of a bruised apple. The clear green parts of the larva of a Puss moth take on a purplish tint, until the whole caterpillar is the shade of a ripe plum, and in many other moths the normal colours gradually grow dim and dark. The rather rare and local Pine Hawk makes an extraordinary colour change in its last skin casting; in its early stages it is green with longitudinal yellowish lines and in this guise it is quite inconspicuous feeding among the green pine needles of a Scot's pine which is its natural food plant. But some time before it makes the journey down the trunk of the tree to seek a soft place in the soil in which to pupate, it casts this rather bright coloured skin and appears in a new one in shades of reddish-brown and cream, with just a touch of dark green, in fact very much like the bark of the tree itself.

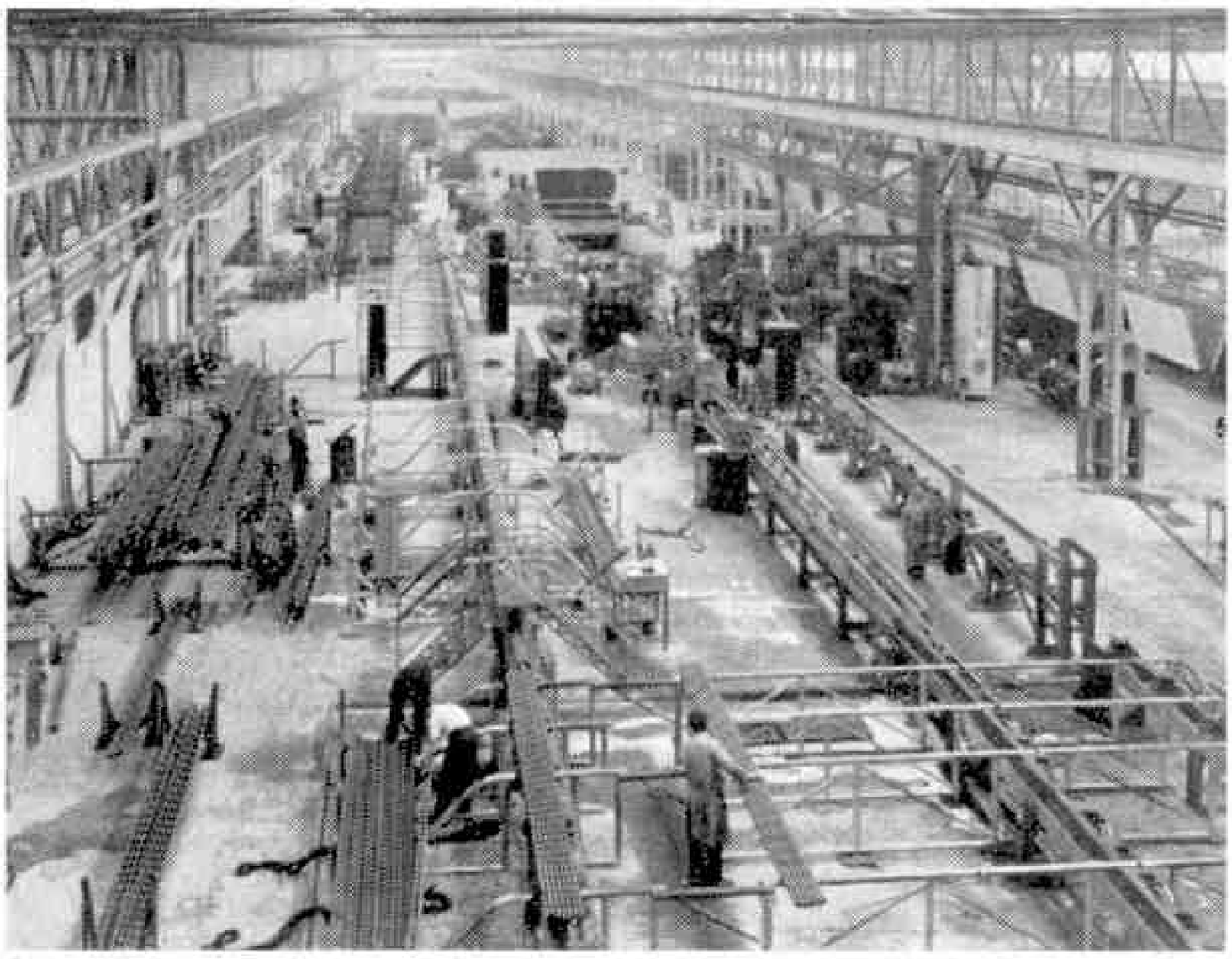
At this critical stage one notices the many different habits the caterpillars have adopted as their method of pupating. Many butterflies crawl up to a vantage point, spin a pad of silk, and then, attaching their hind claspers carefully into this prepared platform, hang upside down to cast their final skin. Several of the Vanessa butterflies, including the Painted Lady, the Fritillaries and the White Admiral, have flecks and studs of gold and silver on their chrysalis shells.

Another group, including the Brimstone and the Swallowtail, spin a silken girdle round their bodies to support the chrysalis in an upright position or on the underside of a leaf. One butterfly only, the Greyling, adopts the habit so common amongst moths, of going to ground, spinning a loose silken cocoon just below the surface of the soil and pupating inside it. But not all moths burrow down; there are those like the Puss moth that chew the bark of the tree upon which they have fed and construct a sort of shelter for themselves.

Making Steel Tube from Strip

Continuous Electric Resistance Welding

AT the Corby works of Stewarts and Lloyds Ltd. there are now two plants that continuously turn strips of steel into tubes of the high quality required for boilers and superheaters. In their progress through the plants the strips are flash welded end to end in order to feed them continuously into the mill in which the tubes are formed. This is done by curving up the edges of the combined strip as it moves through the rolls of the mill, giving it circular form, with the edges brought together. These are joined by electric resistance welding, and the surplus metal at the weld is automatically stripped away, both internally and externally, leaving a smooth and finished tube.



One of the two electric resistance welding tube mills at the Corby works of Stewarts and Lloyds Ltd., to whom we are indebted for our illustrations.

The whole process is continuous. At one end of the production line steel strip is fed in and at the other end the completed tube emerges, ready to be cut into the lengths required.

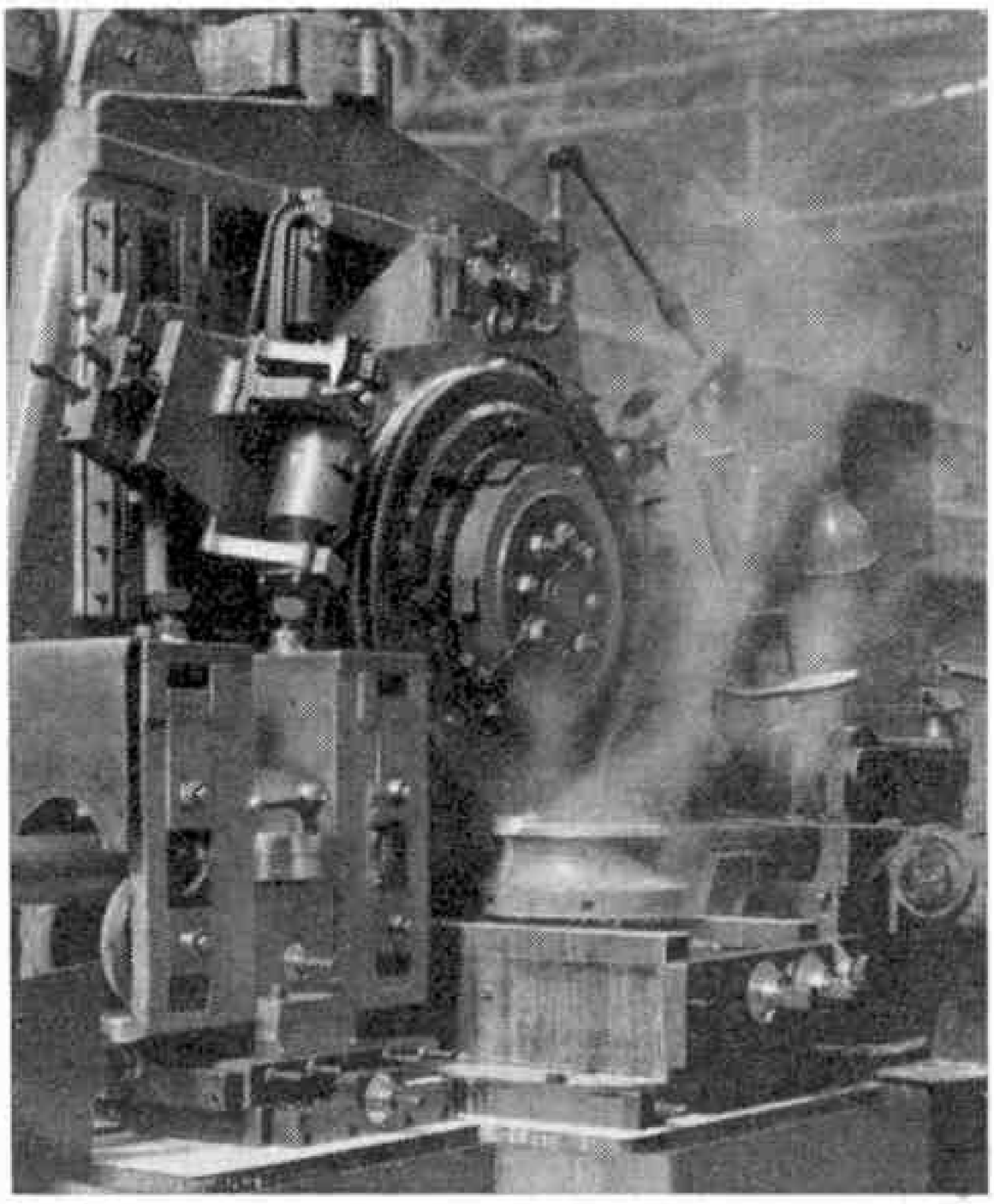
Let us follow the progress of the steel strip through one of these mills. Much preparation is necessary before the actual formation of the tube and the welding to make sure that the process is completely efficient and involves no waste of time, heat or material.

The strips used are 200 to 1,000 ft. in length, depending on the thickness, and weigh 2,000 lb. They arrive from the hot strip mills in coils, and are descaled by passing through a series of rollers that bend them up and down, to crack off all scale and dirt. On leaving the rollers each strip is rewound, and the winding gear is then reversed to loosen the turns. The reason for this is that the next process is pickling in hot sulphuric acid to remove all traces of scale, dust or grease, and loosening the coil gives the acid free access to its surface.

After pickling the strip is washed and is then passed through a cold rolling mill that reduces its thickness and gives it a fine surface finish. In this mill the surface of the strip is oiled. The next step is to weld it to the end of the strip ahead of it. In preparation for this the coil is unwound through a leveller, the rollers of which flatten the strip before the ends of the coils are cut square to present clean surfaces for welding. This is done in a flash welding machine, and surplus metal at the weld is ploughed off by pulling the strip through a pair of cutters. At a later stage this cross weld is cut from the finished tube and scrapped.

An important point is that the flash welding of coils is intermittent, and the strip remains stationary while it is taking place. The part already in the forming mill on the other hand continues to move forward, and to allow for this a loop of the strip is left between the flash welder and the tube mill, to be taken up as tube formation proceeds so that there is always a steady supply of strip for the latter. Before the strip actually enters the mill it is brushed by wire brushes and passed through an edge slitter, which trims it to the exact width and provides it with clean cut edges for the welding operation.

The forming mill, seen in the lower



The formed steel strip passing under the copper double electrode wheel that welds the edges together to produce the steel tube.

illustration on this page, consists of nine sets of rolls that gradually change the flat strip into tubular form by curving up its edges, pressing it down in the centre and eventually rounding it into cylindrical shape, with the edges brought together for welding.

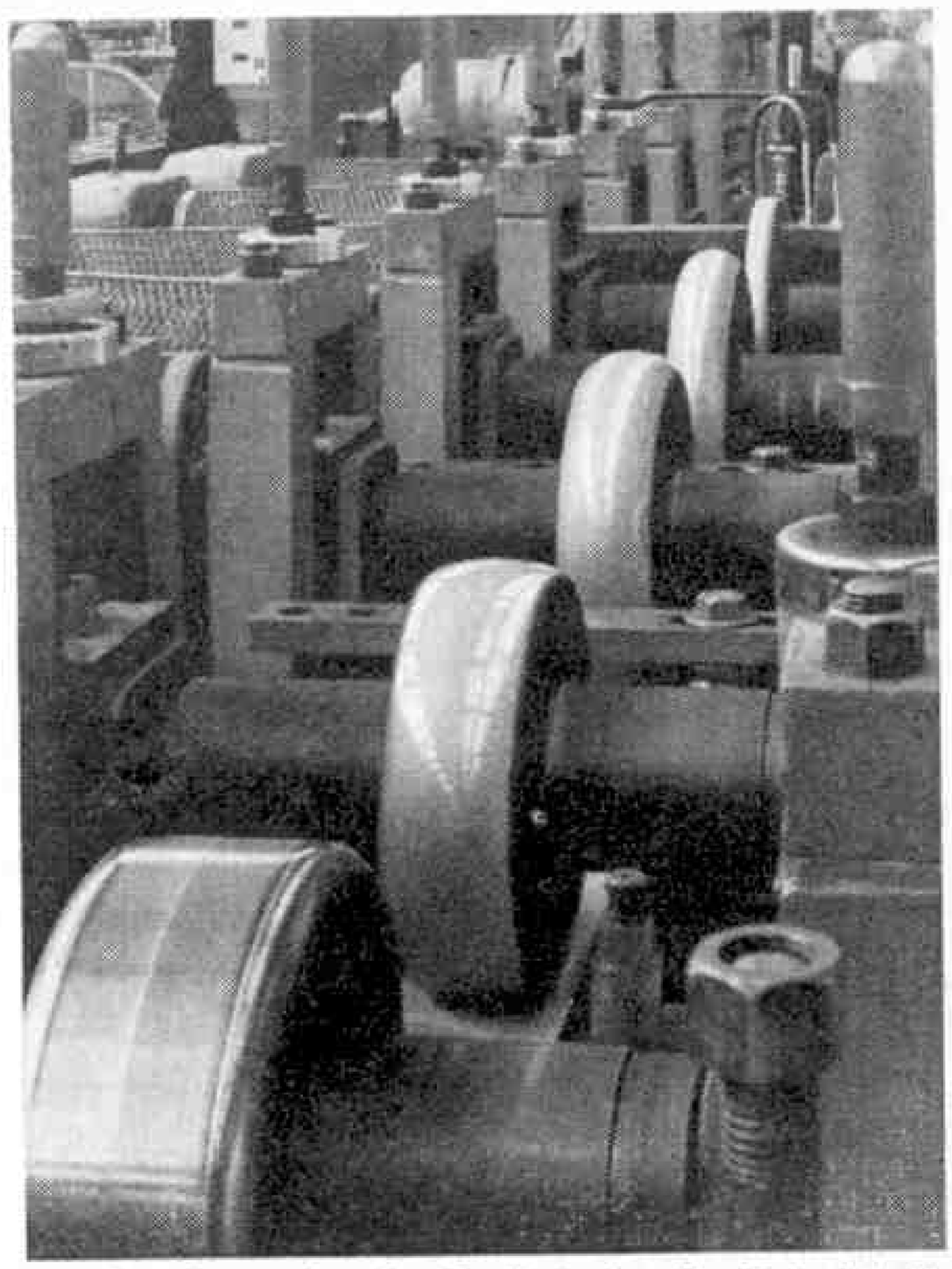
The formed strip, with the edges to be welded uppermost, now passes into the welding machine. In this a large copper double electrode wheel runs on the top of the tube, making contact with the edges, and two side rolls maintain pressure on the tube at this point. The welding current passes down one electrode of the wheel and across the edges to the other electrode, and its passage across the junction heats the metal locally to welding temperature. The heating is very rapid, since speeds up to 100 ft. a minute may be used. It is so rapid indeed that it does not spread appreciably and only a narrow incandescent line is formed along the top of the tube, showing just where the welding is taking place. Surplus semi-molten material is squeezed out by the pressure of the side rolls.

Alternating current up to 40,000 amps. at 4 to 5 volts is used in the welding machine, but its frequency is increased from the 50 cycles per second of the mains supply to 200 or even 350 cycles per second, according to the size of the tube. This is done to give the most efficient welding conditions. With the high welding speed used the pulsations of current at mains frequency would give intermittent welding; those of the higher frequency current used are so close together that welding is continuous.

In the welding process beads are formed at the weld on the outside of the tube and also on the inside. The external bead is trimmed off by a cutter on the outside of the tube. The internal one is trimmed by a similar cutter inside, which is supported by a long rod held from a point in the forming mill just before the strip edges are brought together.

As the tube moves away from the mill water sprays cool the weld. The tube passes into the sizing rollers and a travelling cut-off machine then cuts it into lengths as required without stopping it.

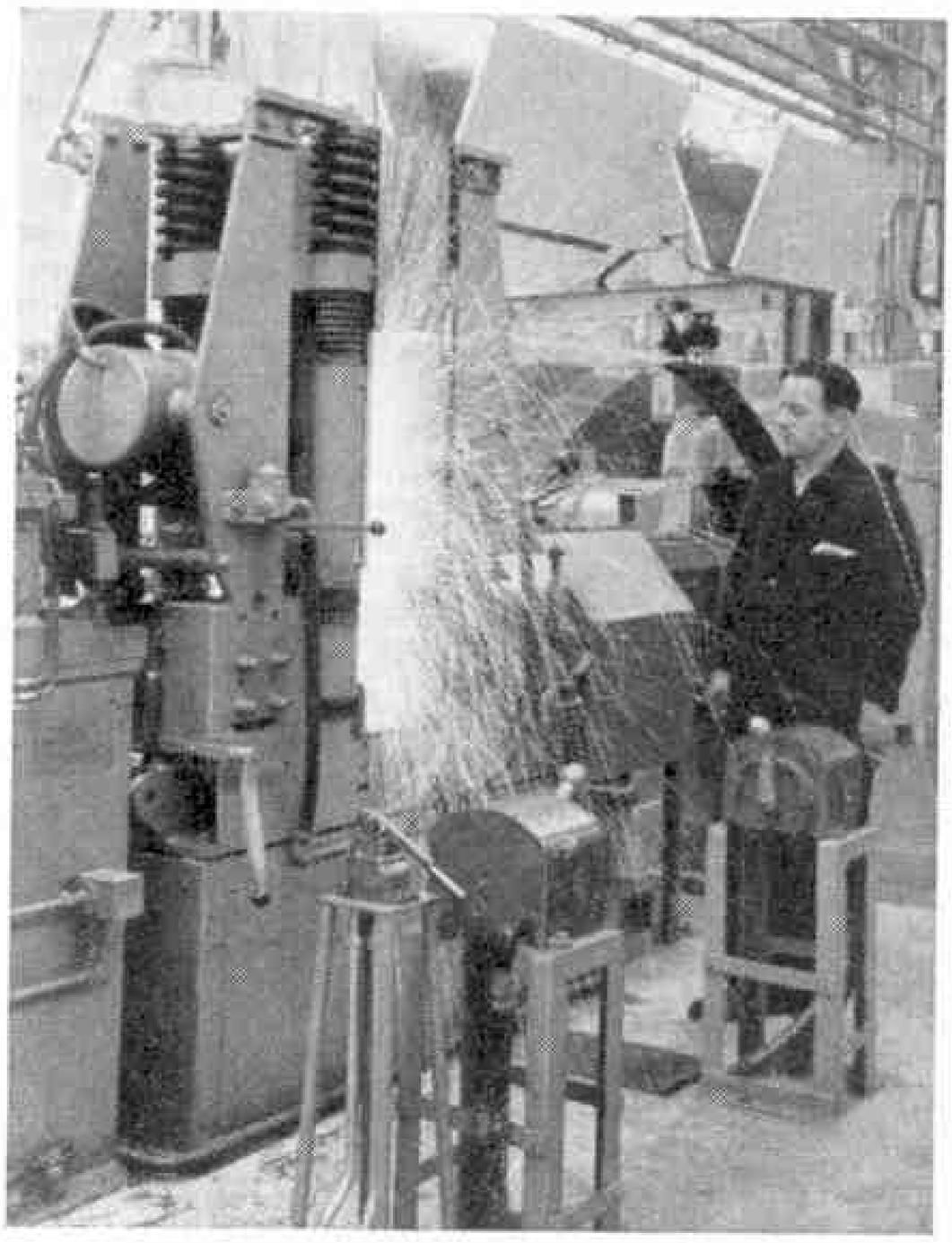
For some purposes the tubes are supplied just as they emerge from the forming mill, but where it is important that they should be ductile, for example, in boiler or superheater tubes, they are passed into a long furnace in which they are "normalised" by heating to the



The forming train of rolls that give the flat strip its tubular form, ready for the welding process shown in the upper illustration on this page.

temperature necessary to restore uniform structure. Then they are cooled slowly in an inert atmosphere which is adjusted to give a blue-black surface of pleasing appearance. The tubes take about an hour to pass through the normalising plant. When the temperature is sufficiently low a coolant is applied to the tube to bring it to room temperature, and it is then ready for straightening, which is done by passing through diagonal rolls.

After normalising the weld is almost impossible to find even with a microscope, except for a very slight difference in surface texture where the outside and inside beads have been trimmed off. The weld is indeed as strong as the parent metal, and the tubes will pass every test specified for seamless tubes. High quality is assured by constant attention to correct working conditions, and by using steel that is completely uniform. Stewarts and Lloyds Ltd. are well placed in the latter respect, as they make their own steel, and ensure that there are no undesirable elements in the strip. Careful control is another factor in ensuring high quality. Skilled inspectors are stationed at various points throughout the steel-making and tube-making processes, and they have power to stop production at any stage if they deem the product unsatisfactory.



A preliminary operation in making electric resistance welded tubes is the flash welding of the strips to give a continuous length ready for the forming mill.

Electric resistance welding plants of the type installed at Corby, in which this wonderful transformation is effected, were developed in America by Babcock and Wilcox. Actually the making of steel tubes by welding the edges of strip bent into circular form was not new, but the new mills give a product of the highest quality, the use of comparatively high frequency alternating current being of particular value in this respect.

Clifton Suspension Bridge—(*Continued from page 299*)

at the plans the less they liked Telford's bridge and in the end it was decided to hold another competition, with Telford as a competitor instead of a referee. Telford's design required such high and massive towers that his bridge simply could not be built with the funds available. Brunel had entered a new design which was placed second. After some discussion this was given preference and Brunel was appointed engineer to the Trust.

All that was wanted now was more money. But the subscriptions asked for came in slowly, and it was not until 1836 that the work began and the foundation stone of the abutment on the south bank of the river was laid by the Marquess of Northampton, President of the British Association, which was then in Bristol, holding its annual meeting.

Brunel's new design incorporated a span much less than those of his previous efforts, the distance between the points of suspension now being 600 ft. His idea had been to have only one chain on each side of the bridge, but to reassure the public he decided in the end to use two chains. He also paid great attention to the architecture of the bridge. His towers or gateways at each end were planned to be particularly grand and effective in the Egyptian style. His idea was to case them with cast iron and to decorate them with figures illustrating not only the construction of the bridge, but also the production of the materials used in building it, beginning with the extraction of iron ore and ending with a representation of the last piece of construction required for the actual bridge. Brunel himself made clever sketches to show exactly what he meant.

The abutment on the south bank had to be very large because of the nature of the site chosen, and it was not completed until 1840. Work proceeded slowly and the flow of subscriptions diminished, so that by 1843 there was no money left, although half the iron work, the suspension of the chains and the rods from it that were to support the roadway, the roadway itself and the completion of the approaches had still to be carried out. The result was that in July 1853 it was necessary to close the works and abandon the whole scheme.

By this time Brunel had become very busy elsewhere, notably with the promotion of the Great Western Railway and with the construction of the *Great Eastern*. He died in 1859, and in the year following members of the Institution of Civil Engineers formed a Company to complete the bridge. They were moved by their interest in the work as a monument to their late friend, and also wished, to quote their own words, "to remove a slur from the engineering talent of the country." Certain changes in design were necessary and the decorative schemes for the gateways were not carried out, but this time the works were carried on with great vigour and the bridge was opened ceremoniously on 8th December 1864.

Air News

By John W. R. Taylor

First Military Comet

The de Havilland Series 1A Comet supplied to the Royal Canadian Air Force does not differ much from Comets already in service with British, French and Canadian civil airlines. Its primary purpose will be to carry passengers for R.C.A.F. Air Transport Command; but, together with a sister-ship which will be delivered later, it will also serve as a "bomber" during Canadian air defence exercises.

At the moment Canada has no jet bombers; so its home defence fighter squadrons, anti-aircraft units and raid plotting organisation are unable to carry out realistic training against surprise air attacks by modern aircraft. The two R.C.A.F. Comets will in future give them plenty of practice by making 500 m.p.h. "raids" on Canadian cities and airfields with imaginary atom-bombs, from a height of seven or eight miles.

Looking for Bad Weather

Bristol Brigands of No. 1301 Meteorological Flight, R.A.F., based at Negombo in Ceylon, have completed a three-year programme of investigation into monsoons and tropical weather conditions, which involved flying into rain so heavy that it was impossible to see even the engine cowlings from the cockpit. The wire mesh of their de-icers was cut to ribbons, and parts of the propellers were severely damaged. But even this was less unpleasant than flights made in thunder-clouds containing wind currents so strong that the aircraft were tossed about like corks on the sea.

Main object of the programme, which covered nearly half a million square miles of the Indian Ocean, was to examine behaviour of the Inter-Tropical Front, the area of demarcation between the air masses generally associated with the Northern and Southern Hemispheres. It was found that excellent flying conditions lasted for much of the time; but that the Inter-Tropical Front could be violently active one day and on the following day give no sign of its existence. Aircraft used for the job were basically the same as the R.A.F.'s Brigand twin-engined fighter-bombers, but with special "met" equipment and oxygen apparatus installed in place of armament.

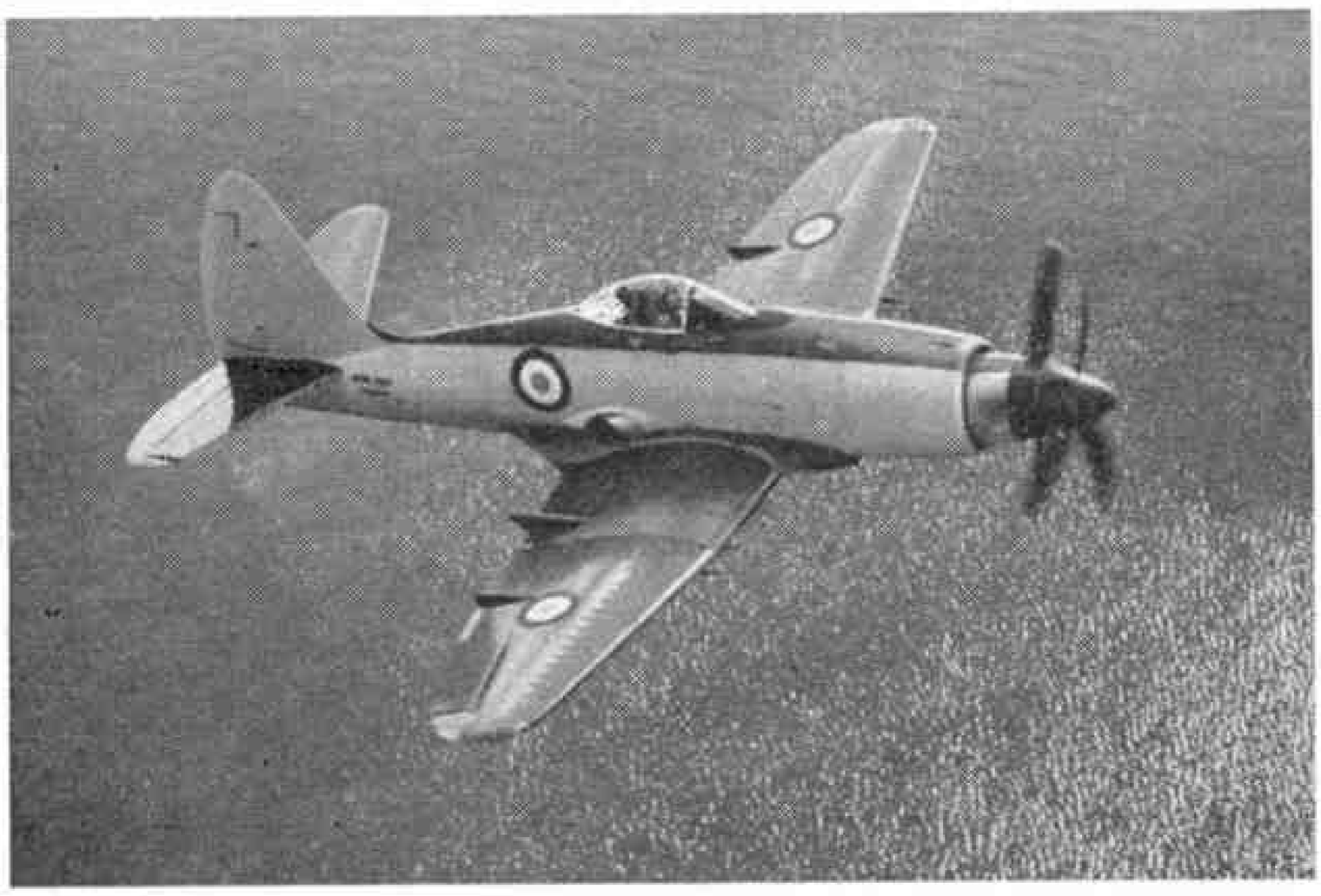
Boeing's "Project X"

The Boeing Airplane Company, of Seattle, U.S.A., are designing and building a prototype jet transport known as "Project X." It will be a four-engined sweptwing aircraft, with the engines suspended in pods beneath the wings, as in the B-47 Stratojet bomber. Cruising speed will be well in excess of 500 m.p.h., and "Project X" will be suitable for service as either a passenger and freight transport or as a flying tanker for flight refuelling high-speed jet bombers. The prototype will cost more than £5,300,000 and is scheduled to fly in 1954.

Flying Hospitals

Temco Aircraft Corp., who two years ago transformed a number of C-54 Skymaster transports into flying hospitals, have received a U.S.A.F. contract to modify a Boeing C–97 Stratofreighter for similar duties. If successful, they will receive a production order for conversion of a large fleet of C–97s into "hospital ships."

Modifications will include installation of a galley immediately aft of the crew compartment, toilet facilities, sound-proofing, special heating, ventilation and lighting, life rafts, medical equipment and either 60 folding, rearward-facing seats or 54 stretchers and 15 seats. They will be so arranged that the aircraft can be converted immediately for cargo-carrying when necessary.



Westland Wyvern S.4 strike fighter, a type now coming into service with the Royal Navy.

More Streamlined Bombs

Public enemy No. 1 of the aircraft designer is the man who hangs bombs, rockets, fuel tanks and other equipment under the wings of his nice "clean" aeroplane, reducing its performance by anything up to 15 per cent. The loss of speed and handling qualities is even worse in the case of a jet; so the U.S. Navy asked Douglas Aircraft if they could produce a new, more streamlined shape for bombs and fuel tanks.

The result, known as the Aero X–1A external store was tested in the form of fuel tanks under the wing of a Douglas F3D Skyknight jet night fighter. Formed to look like a slim cigar or supersonic missile, they enable the Skyknight to fly nearly 25 m.p.h. faster than with old-type 150 gal. tanks. A bomber carrying three 2,000 lb. bombs of the new design flies more than 50 m.p.h. faster than if mounted with three standard 2,000 lb. bombs, the design of which originated 25 years ago when aircraft flew little more than 100 m.p.h.

Aviation Speeds Harvest

British scientists are working on a new technique for drying quickly a crop like wheat or barley by spraying it from the air with what is called a "dessicant." This is a chemical which is sprayed on the crop eight or nine days before harvesting and which prevents water from moving from the roots up to the head and leaves of the grain. The dry crop can then be harvested and stored safely with no risk of rot, at about half the cost of artificial drying.

Experiments made recently in Britain show that aerial spraying, compared with ground methods, gives more even ripening of the grain and less likelihood of over-ripe kernels being shed.

* * * *

A French designer named Jodel is building a light 'plane, powered by a German Volkswagen car engine. He hopes to sell the plans for £5 a time to people who would like to build their own aeroplane at home.

More Helicopters for the Navy

The Royal Navy continues to show more interest in helicopters than the other British services. To supplement its squadron of American-built 10-seat Sikorsky S-55s, serving in Malaya, and its fleet of S-51 Dragonflies, it has now started up a proper helicopter training school, equipped with 20 Hiller HTE-2s supplied by the United States under the Mutual Security scheme.

The three-seat HTE-2 is basically similar to the U.S. Army's H-23B casualty evacuation helicopter, which has been used with great success in Korea, carrying two external, heated litters as shown in the upper illustration on this page. It has a 200 h.p. Franklin engine, operating speed of 70 m.p.h., and a four-wheeled undercarriage.

U.S. Army H-23B helicopter with external heated litters, as used on casualty evacuation service in Korea. Photograph by courtesy of Hiller Helicopters, U.S.A.

Whale-Spotting by Auster

Mr. J. Pekin of Maylands Aerodrome, Perth, Australia, has found an unusual and profitable job for his little Gipsy-engined Auster Aiglet light 'plane. During a period of 103 days last season he spent 680 hrs. flying at a height of 200 to 1,000 ft. over the sea, spotting humpback whales for catcher boats owned by the Nor-West Whaling Company.

Working with a team of three boats, 20 miles off-shore, his job was to fly over to inspect the whales for size and species the instant they surfaced, and radio the information back to the catcher boats, which then raced in for the chase and kill. This is by no means as simple as it sounds, because in bad weather it involves flying low at about 60 m.p.h. in a single-engined aircraft over a sea in which Mr. Pekin has often watched groups of 100 sharks devour completely a 40-ton dead or wounded whale in 30 minutes.

New Sweptwing Naval Jet

During the debate on Naval Estimates in the House of Commons, it was announced that the Royal Navy is to receive twin-jet, single-seat sweptwing fighters of tremendous power. They will be developments of the straight-wing Supermarine 508, which has two Avon turbojets; but the 508's V-shape "butterfly" tail will almost certainly be replaced by an orthodox fin and tailplane.

France's Supersonic Fighter

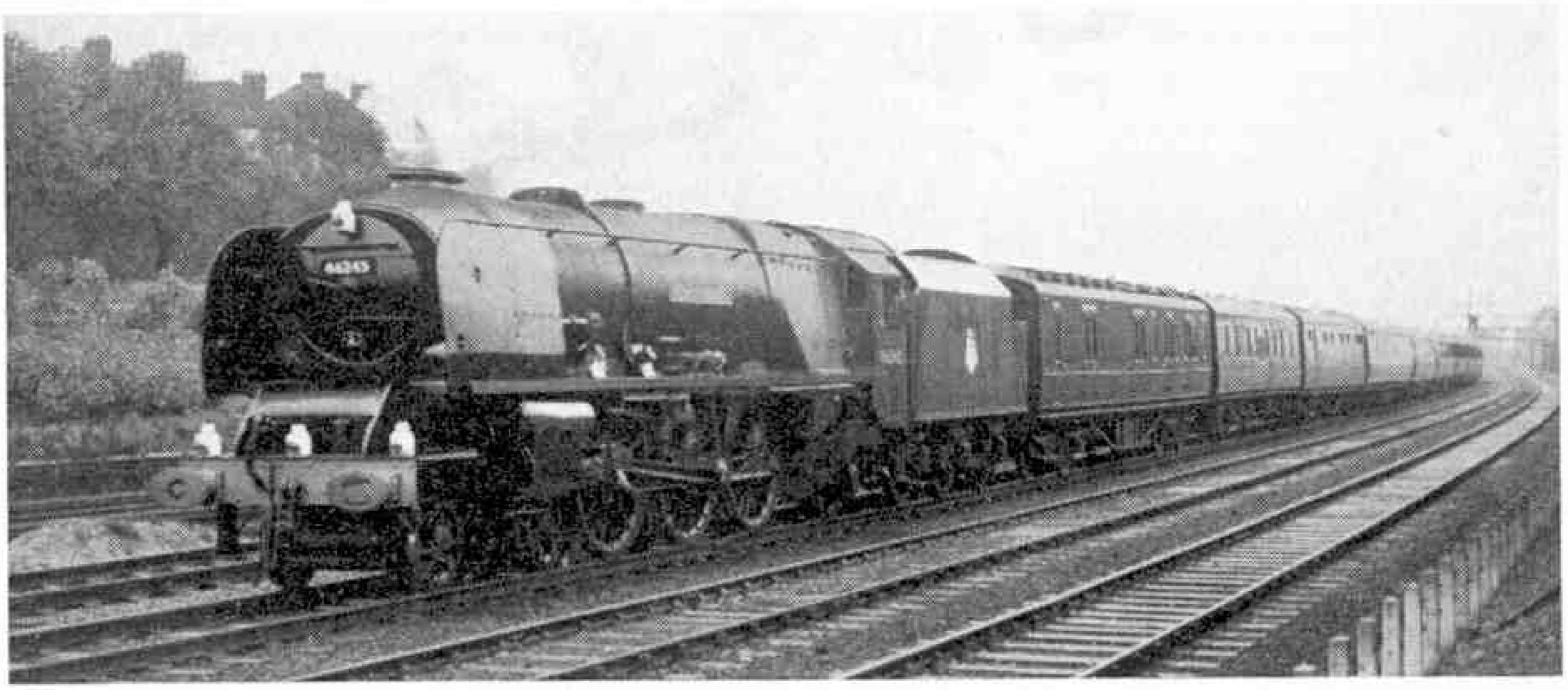
The vicious-looking aircraft shown at the foot of this page is, according to its makers, the S.N.C.A.S.O. company of France, the first fighter 'plane in the world able to fly considerably faster than sound in level flight. Known as the S0.9000 Trident, it made its first flight on 2nd March at Melun-Villaroche, 15 months after its construction was started. Few details of its design have been released, but it appears to have a rocket motor in its fuselage and jet engines mounted on the tips of its stubby wings. Idea, is, probably, to use the jets for cruising and the fuel-thirsty rocket for take-off and in combat; but the bulky jets will almost certainly be replaced eventually by simpler, lighter ramjets.

Sky Lights

People in Singapore are no longer surprised when they see a neon sign advertising Pepsi-Cola soft drinks floating around the sky above their heads at about 100 m.p.h. It has been fitted under the wings of a standard Auster 5 light aeroplane by Auster Aircraft, who can instal similar electrical equipment, including racks and connections to take most standard size neon-tube letters, to any of their range of light 'planes, at a cost of just under £500.

The idea is not new, as MacRobertson Miller Aviation Co. of Australia fitted neon signs advertising ice cream to a Moth, and flew it over the Adelaide Agricultural Show some 20 years ago; and the American Goodyear company have fitted many different types of neon advertising signs to the sides of their small non-rigid airships.

The French SO.9000 Trident supersonic fighter. Photograph by courtesy of S.N.C.A.S.O., France.



The Operation of Royal Trains

By S. C. Townroe, A.M.I.Mech.E.

WHEN Queen Victoria travelled by rail, a light engine was run 15 minutes in advance of the Royal train. On the appearance of this locomotive herald of approaching royalty, all railway movements and activities were immediately brought to a standstill, until after the Royal train had passed.

When Her Majesty Queen Elizabeth travels by rail at the present time, many special precautions are taken to ensure a safe and an uninterrupted journey. Because of the serious dislocation that would be caused to modern railway traffic, however, the prohibition of all movements of other trains is not now so strict, and the practice of running a light engine ahead is not perpetuated. Queen Victoria is stated to have asked the old Railway Companies to take the same care of their ordinary passengers as they did of her, but no doubt if she had been made fully aware of the elaborate steps taken, she would have realised the impracticability of applying such safeguards to everyday working.

Today, ordinary trains are precluded from occupying the path of the Royal train, or crossing the line on which it will run, for a certain time interval, not from fear of a possible collision, of course, but to avoid any chance of delay. All shunting in proximity to the running line must cease, just in case there might be some mishap, however remote, that could cause trouble.

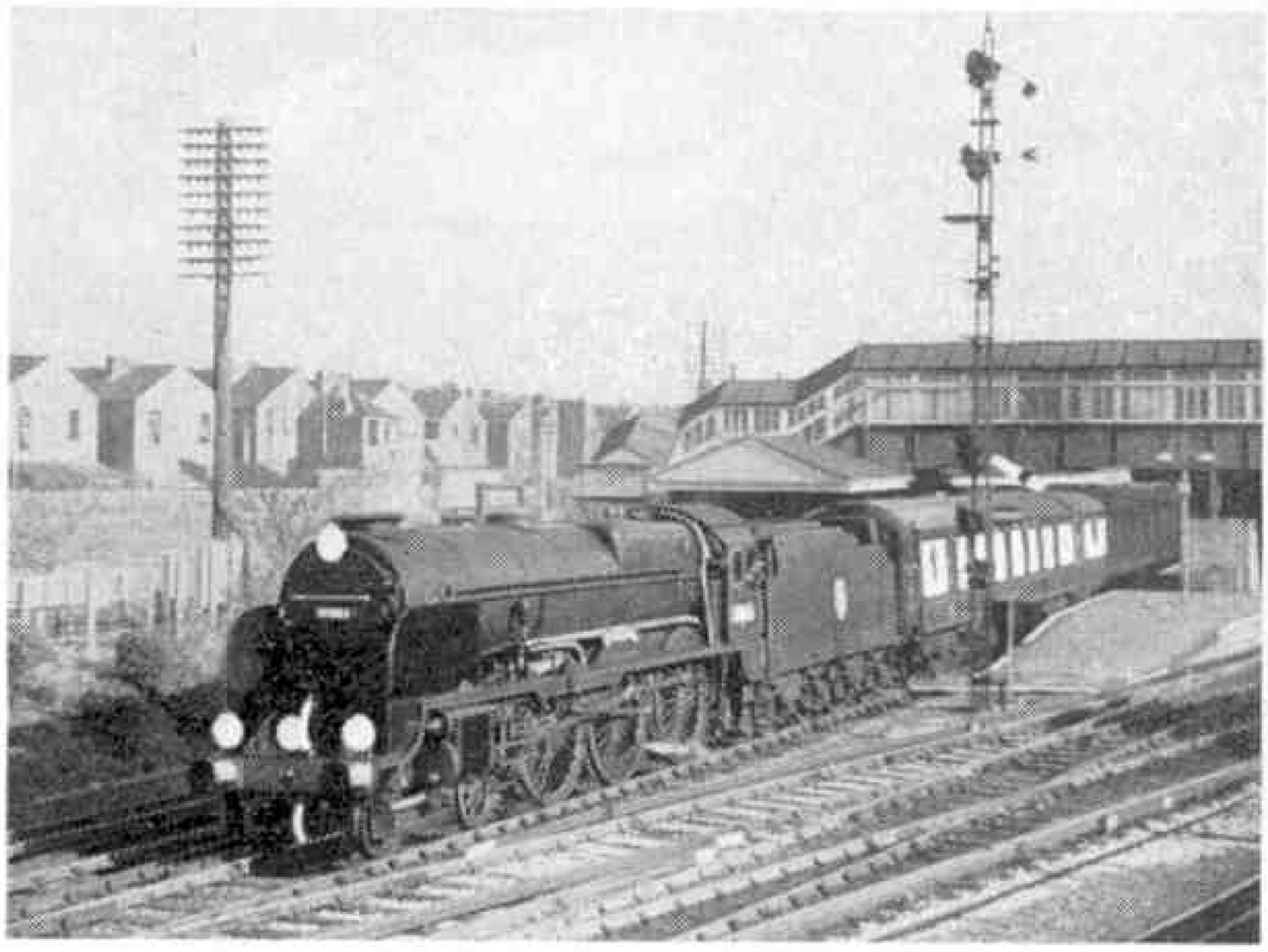
The L.M.R. Royal train heading south from Ballater behind No. 46245 City of London. The engine carries the four headlamps that denote a Royal train. British Railways Official Photograph.

Passenger trains running in the opposite direction are permitted to run normally, but freight trains must be stopped before passing the Royal train and the guard must carry out an examination of all the wagons to see that all loads are secure and within the loading gauge, so that nothing could foul the adjacent track. Where there are four or more parallel lines, drivers of other trains going in the same direction are forbidden to run alongside the Royal train for longer than can be avoided.

Signalmen have instructions to adhere to Absolute Block working. Whilst this principle does, in fact, apply to normal operation there are certain places in the vicinity of busy junctions where modifications in block working are authorised, in order to reduce the headway between trains and thereby permit greater flexibility in working. For the Royal train, all such modifications are temporarily cancelled. Signalmen at junctions must not accept trains approaching from branch lines; such trains must be held, if necessary, at the last signal box on the branch line.

Where there are two signal boxes less than a mile apart, both sections under the control of these boxes must be clear for the Royal train. This safety precaution is known as double-block working, and may also be put into force for high-speed trains.

Every Stationmaster is expected to be on duty at his station. He has many



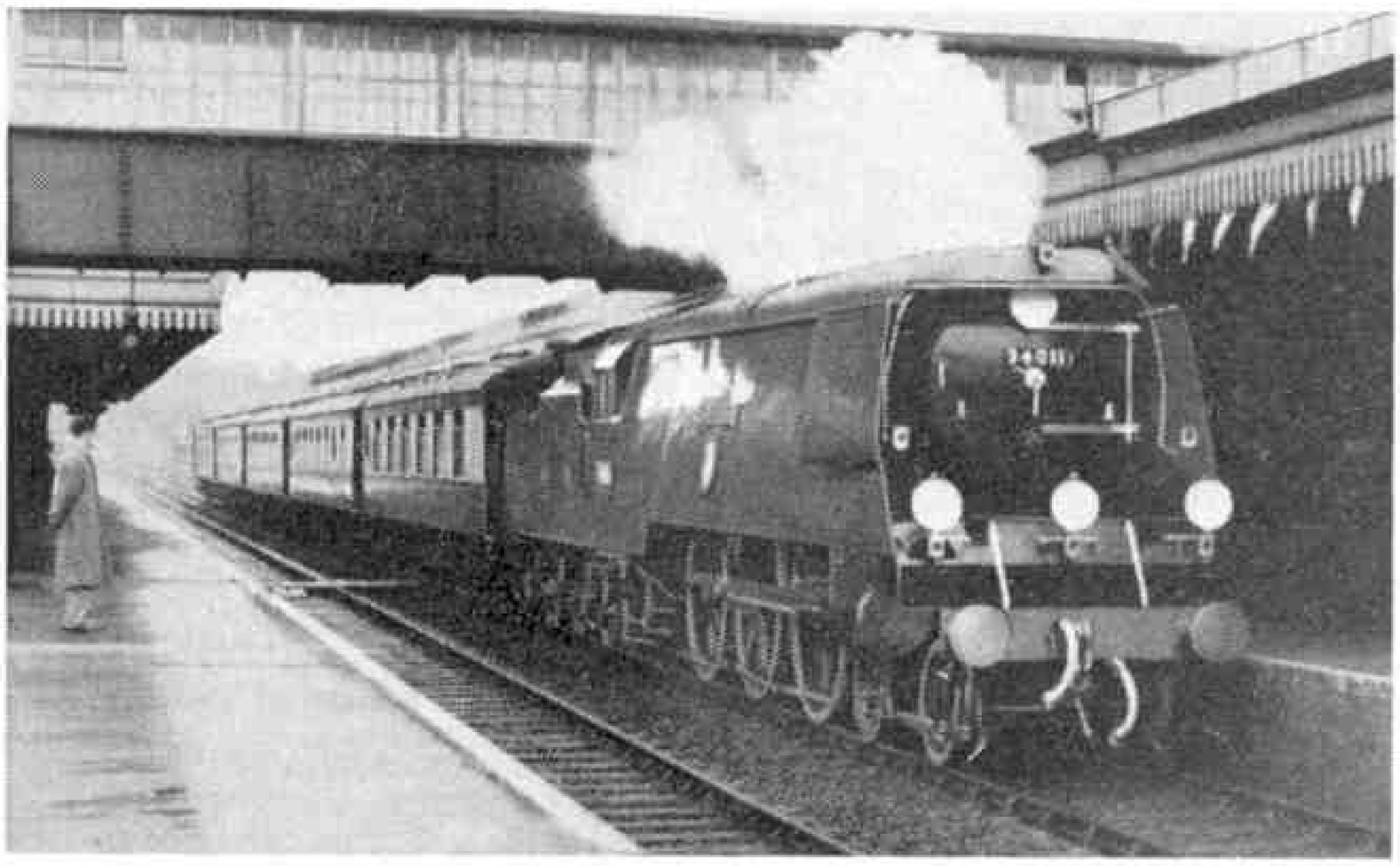
A Royal train of Pullmans in charge of Nelson class 4-6-0 No. 30863 Lord Rodney passing Fratton, en route for Portsmouth. The photographs on this page are by Pursey C. Short.

details to worry about, for in addition to his responsibility for strict performance of the operating rules on the part of his signalmen, he must see that no luggage barrows have been left on the platform without brakes applied, with the consequent risk that they might fall on the line. He must see that water-column hose-pipes are chained up and that the G.P.O. lineside mail-bag apparatus, where it exists, is in a safe position. If there is a level-crossing, the gates must be kept closed to road traffic in good time. Nor must he overlook the presence of any horses in the Goods Yard, which might break loose! In co-operation with the police, a watchful eye is kept by all railwaymen, not only at the stations but all along the line.

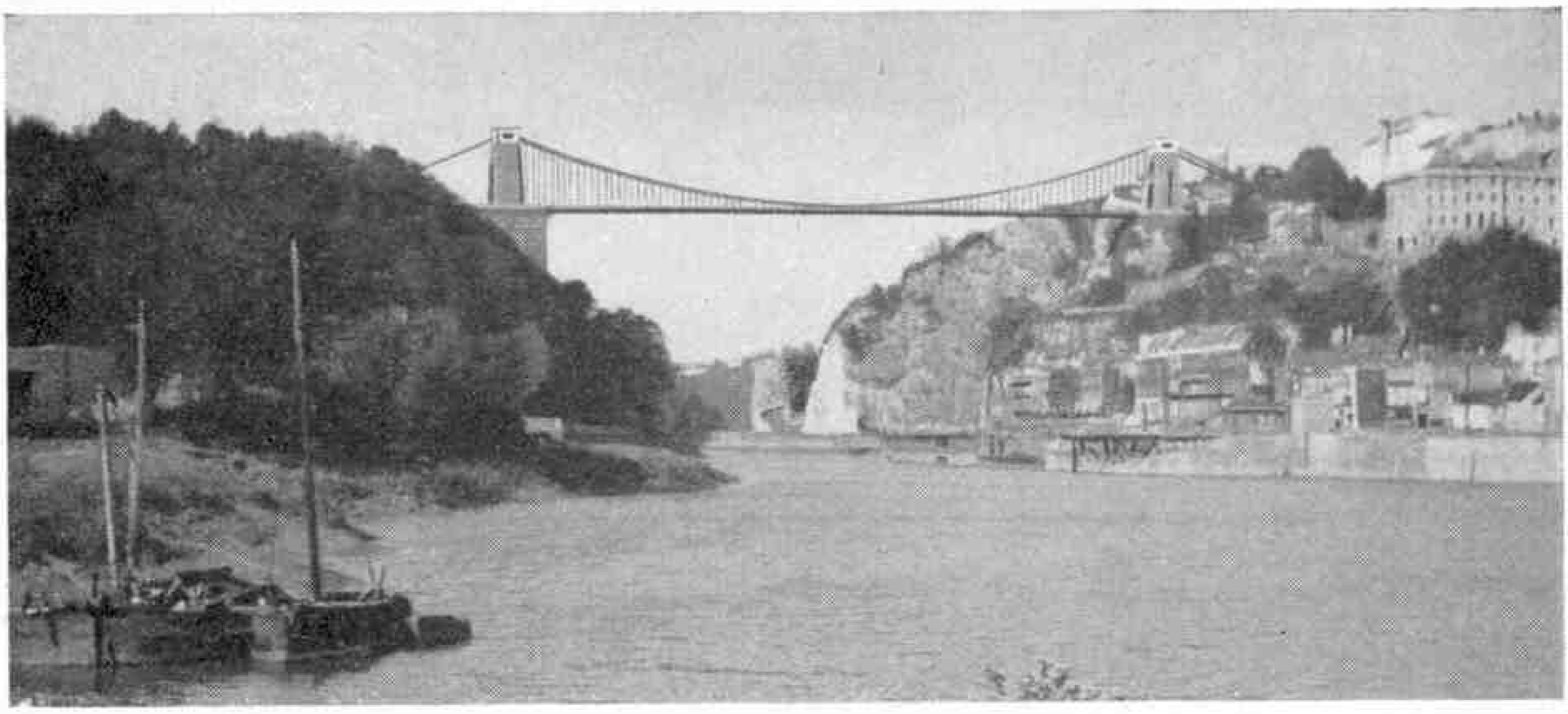
The engine of a Royal train carries the well-known headcode, consisting of a lamp or disc board at the foot of the chimney and three lamps or boards on the brackets over the buffer-beam. How many people have noticed that the Royal train carries two tail-lamps, instead of one? If the tail-lamp on an ordinary train is missing, or the light is not burning at night, signalmen must observe this fact and arrange for the train to be stopped at once. The Royal train, however, need not be brought to a stand unless both tail-lamps are missing or both the lamps are unlit at night. This would be very unlikely.

In the Royal train itself, railway officials are on the alert for any defects or unusual behaviour of the rolling stock. Accommodation is provided in the train for locomotive fitters, who are ready to deal with any engine trouble, and for carriage fitters, who look after the coaches. There is a telephone lineman in the train and if the train broke down a portable telephone set could at once be connected to the lineside wires in order to summon assistance quickly. A telephone connects the engine footplate to the leading coach, to enable the officials to keep in contact with the driver and to advise him whether the speed should be increased or decreased according to the schedule. Spare parts, such as flexible steam pipes, screw couplings and vacuum pipes, are stocked in the brake vans. In addition to the railway staff, the train carries dining-car stewards, detectives

(*Continued on page 330*)



In accordance with Southern custom No. 34011 Tavistock displays four discs to denote a Royal train. This view was obtained at Fareham last November on the occasion of the visit of H.M. the Queen to the Fleet Air Arm, Lee-on-Solent.



Clifton Suspension Bridge

By the Editor

THE world is full of great bridges, as every reader knows, for the stories of many of these have been told in articles contributed to the Magazine. There is eternal interest in such mighty structures as the Forth Bridge, the great suspension bridge spanning the Golden Gate, that wonderfully-named approach to the harbour of San Francisco in California, Sydney Harbour Bridge, and many others in various parts of the world that are remarkable for their size. But smaller bridges can be equally interesting as the works of pioneers or for historical reasons. A good example is the Clifton Suspension Bridge, which has a span of only 600 ft.—that of the Golden Gate Bridge is 4,200 ft.—and crosses the River Avon at a height of 245 ft.

This bridge is notable because it is a memorial to a great engineer, who in fact did not really build it. This sounds strange, but the explanation is quite simple. The engineer was Brunel, one of the most original figures in the history of British engineering. He designed the bridge, but funds for its construction ran out before he had got very far and the structure was completed, more or less to his designs, only after his death.

Another noteworthy feature of the bridge is its curious connection with two other famous bridges built by Brunel. One was the Hungerford Bridge, which carried a railway across the Thames at Charing Cross; the other is the Saltash Bridge, on the former Great Western Railway. The chains made for the Clifton Suspension Bridge were actually used for the latter, and when the Clifton Suspension Bridge was actually completed the missing chains were replaced by those of the Hungerford Bridge, then being demolished.

The Clifton Suspension Bridge spans the gorge of the Avon at a height of 245 ft. It was designed by the famous engineer Isambard Kingdom Brunel, and construction was begun under his direction, but work on it had to be suspended for lack of funds and it was not completed until after his death. The illustrations on these pages are from photographs of the bridge by Reece Winstone, Bristol.

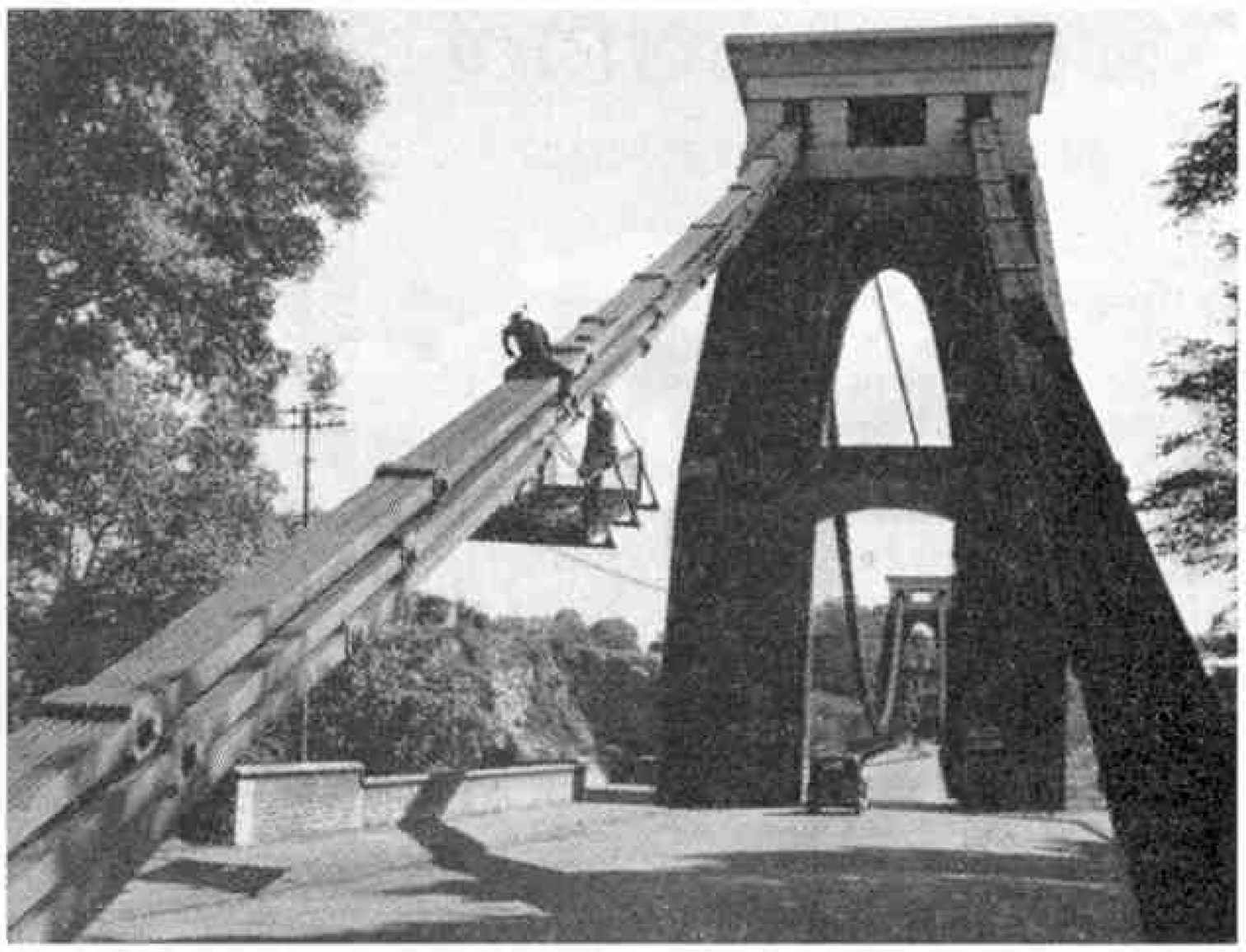
The story of the Clifton Suspension Bridge started in 1754, when William Vick, an Alderman of Bristol, left £1,000 to be retained by the Society of Merchant Venturers of Bristol until with compound interest it reached a total of £10,000. Then it was to be used for building a stone bridge across the Avon from Clifton Downs to Leigh Downs.

The Alderman had been told that such a bridge could be built for less than £10,000, but 76 years later, when the original bequest had reached £8,000, it was discovered that a stone bridge would probably cost about £90,000, so any idea of building a structure of this kind had to be abandoned.

But in the meantime Thomas Telford had built the great suspension bridge across the Menai Straits connecting the mainland of Wales with the Isle of Anglesey. So the Committee advertised for designs for a suspension bridge across the Avon, hoping to be able to settle upon a scheme that

would fulfil Alderman Vick's wishes, but would be much cheaper than that of building the stone bridge he had visualised.

At this moment Brunel was waiting, so to speak, for the cue to take up his part in the story. He had previously assisted his father in driving a tunnel under the Thames, in the course of which he had a narrow escape when water broke through into the workings, but for some time he had been disengaged. A friend told him about the advertisement, and he immediately went to Bristol. After studying the position he designed not one bridge, but four. Brunel was always prolific in designs for anything that attracted him!



A never-ending task. As soon as painters have taken their cradle from one end to the other it is time to begin all over again.

Brunel's designs for the Clifton Bridge were on the daring scale that was characteristic of him. He actually proposed spans of well over 1,000 ft., although the longest suspension span of the time was the 600 ft. of Telford's Menai Bridge. He would not listen to the idea of breaking the span into two or three lengths, for this would have meant building up one or more enormous piers from the edge of the water in the gorge of the Avon to a sufficient height to carry the chains. The latter were to be of a new type, with links connected directly with each other by means of pins passed through holes or borings instead of being joined by the connecting links. The links too were to be 16 ft. in length, nearly twice that of the longest links of the Menai Bridge.

Apparently there were 22 rivals for honour of bridging the Avon, but only five produced schemes worthy of consideration, one of them of course Brunel. The Committee knew little about suspension bridges, so they called in as referee no less a person than Thomas Telford. This was unfortunate for Brunel, for Telford thought the span of his Suspension Bridge too long and that the structure, ingenious as it was, would only be blown down in a very high wind. Brunel immediately withdrew his plans, and went away on visits to manufacturing towns in the North.

This left the way clear for Telford himself to have a go, and a suspension bridge of three spans that he now designed was greeted with a flourish of of trumpets. But the more the people of Bristol looked (*Continued on page 293*)

Collecting toll from a motorist about to cross the bridge.

Survival School

Living in the Arctic

By Frank Illingworth

IN Canada, air force and civil pilots and aircrew are being taught "how to survive if forced down in the Northlands." The opening of Survival Schools reflects the extension of civil and military aviation across the last recesses of a polar area something like twice the size of the United States.

The first Survival School was established by the Royal Canadian Air Force at Fort Nelson, in Northern British Columbia, four years ago. Later a second school was opened on the frozen shores of Cambridge Bay, way up in the Arctic regions. Why? Partly because the airfreighter had become the foundation of the development of Canada's minerally rich Northlands.

Aircraft are not only used to put prospectors down in the uninhabited barrens, keep them supplied and then "pull them out." They are used also on an airlift scale in the actual broaching of Canada's natural wealth. For example, between October and April, when the rivers are frozen, aircraft are used to fly concentrates from the rich uranium mine on the shores of Great Slave Bear Lake, just south of the Arctic Circle, to railhead, and a summer and winter airlift is maintained to fly fish from the sub-Arctic fishing centres of Hay River to railhead.

F/O John Christensen, R.C.A.F., at Cambridge Bay in Arctic Canada, wearing protective nylon suiting.

And again, aircraft are "standard practice" in the actual construction of railways, etc., across broken country. For instance, helicopters are being used to drop supplies to the construction gangs erecting powerlines across 500 miles of an almost unexplored 5,000-foot high plateau in Northern British Columbia.

Canadian Pacific Airlines operate scheduled services to most of Canada's Arctic and sub-Arctic mining and fur-trading localities, and bush pilots act as work-horses, flying a motley assortment of aircraft. These range from Norsemen and DC.3s to the 1927 Junkers with which the bush pilot Rus Baker serves an area roughly the size of Wales.

The bush pilot is well qualified to look after himself in the event of being forced down, for in most cases he has learned his aviation in the Northlands. But the development of scheduled air services to the very shores of the Arctic Ocean, the increase and scope of industrial airlifts and the extension of R.C.A.F. activities northward necessitated the training of aircrew in Arctic conditions.

A trainee at the School of Survival at Fort Nelson tries his hand at driving dogs.

And again: *The new Europe-to-Asia Polar Air Route, which opens this summer, has emphasised the need for survival schools exclusively for civil aircrew.* So it is that week by week squads of grown men are undergoing instruction such as might thrill a Boy Scout—how to build an igloo and a tepee, to snare a rabbit and to cross unmapped country in safety, which plants are edible and how to make poisonous plants and fish edible. The Survival Schools and their Eskimo instructors have made the difference between life and death for many airmen, and as Arctic aviation develops so the Survival Schools will play an ever more important part in world air transport.

An Eskimo instructor at Cambridge Bay gives a lesson in igloo building. His pupils actually build igloos for themselves under his watchful eye as part of their training.

The Survival School has two main purposes: the first of course is to teach aircrew, and through them passengers, to survive in the event of a forced landing in the polar regions; the second is to help aircrew to overcome the natural fear of the 'barrens,' a fear that has persisted since the earliest days of exploration. And the curriculum is vigorous. Many a student has lost as much as 20 pounds during the three weeks course, for the latter includes "living off the land" in Arctic forest and tundra for ten days to a fortnight.

The course opens with theoretical training. For example, the student is told that he will need one quart of water per day while "living out" in the Northlands, and that on no account must he eat snow "raw." Why? Because it causes dehydration of the body and subsequent discomfort, and it can also cause agonising cramps. While on this subject it is pointed out that there is no need to cut ice into shavings for melting, "because big lumps of ice melt just as quickly as small pieces;" and another point in the matter of providing water in a land where in winter all water is frozen solid is that if you melt ice instead of snow you'll save 50 per cent. in time and fuel. All simple enough! But of vital importance to a man trying to reach country calculated to tax him to the full.

Part of the theoretical course includes instruction in how to build shelters against cold, wind or rain. If you have no parachute—which can be made into a tent with the aid of four longish branches—then you are told to "construct a framework of evergreen boughs, fill in the framework with furze or other greenery, lay a platform of brush for a mattress—and there you are." And if there are no trees? "Dig a hole in a snow bank, slightly up-grade, then dig a room out at the end of the tunnel and thrust a pole or something upwards into the open air for ventilation." Or build an igloo—and here is how, with diagrams drawn under the guidance of Eskimo igloo builders.

The trainee learns that to perspire in the Arctic can be as deadly as falling through ice, because immediately a man rests from work the perspiration on his body freezes, causing frostbite; and he is told that to be warm in a sleeping-bag he must sleep completely naked, even if the mercury stands at minus 70°F. He is

told that to use an axe in extreme cold without first warming it may well see it splinter like glass, and that he can determine slight sounds more clearly if he closes his eyes. He is shown how to snare the lopperty-eared Arctic hare, how to skin a seal and catch a lemming, the strange Arctic rat that commits mass suicide every few years; in fact how, in theory, to survive all the dangers of living out in the bitter Northlands. And having absorbed the theory he is turned out—"to die or survive!"

In parties of six or eight, the pupils are sent on to the tundras wearing what

How to snare a rabbit is demonstrated by an Indian expert.

they stand up in—standard northern flying suiting. They carry the oddments of equipment calculated to survive an aircrash—one rifle, a length of cord and one fish-hook, a parachute, one knife, a little wire and K. rations; and one *Survival Manual*—by far the most important item.

The Survival Manual is among the most remarkable of publications. Compiled by Eskimo and whites with years of experience in the Arctic, it is designed to answer any and every question arising from life in the wilderness. A small, soft-covered hip-pocket booklet, it includes such advice as on no account to eat polar bear liver—it is rich in vitamin and causes violent headaches, sickness and, in extreme cases, death. But, says the Survival Manual, the forked stems of carrageen moss can be boiled into tasty jelly, and seal meat is good to eat—but remember not to get your hands too greasy when eating, because grease conducts the heat away when you put your gloves on and that can mean frostbite.

The Survival Manual is indeed a tome of information. All fish may be eaten, it says. But some freshwater fish found in Arctic river and lake contain parasites that make one sick. And whereas the deadly poison contained in Arctic black mussels cannot be "boiled out," poisonous parasites can be rendered harmless by boiling. If you see a white polar hare all you have to do is turn to H in the Manual to find how to catch it, how to skin it without a knife and cook it over a moss or peat fire. "You can't go wrong," I was told at the Fort Nelson Survival School.

The R.C.A.F. Arctic Manual stresses the value of seaweeds to the airman who crashlands on the coast of Northern Canada—sea lettuce, which resembles crumpled tissue paper, or purpleweed, both of which should be eaten raw or boiled into a soup. Carrageen moss, which I have already mentioned, clings to stones under water. The flat forked stems, capable of giving good soup or jelly, are up to 12 inches long.

On a recent flight across the desolation of Labrador's barrens to the new 225,000,000 dollar iron mining venture Ungava, I pointed down at the contortion of bare broken rock and ice beneath our wings, and commented that I would not fancy making a forced landing in such country. "Me neither—anyhow up to the time I went to the Survival School. It's different now. If I was forced down I'd know how to survive—and how to keep you O.K. too."

And in this sentence is the essence of the Survival Schools' purpose: to train the aircrew on the new Arctic airservices to look after themselves in an emergency—and to look after their passengers.

Photography

Cloud Backgrounds

By E. E. Steele

UPON looking through any average collection of amateur snapshots it is surprising to find how many are made unsatisfactory by unsuitable choice of background. When this is mentioned it is pointed out that natural backgrounds cannot be arranged, like those in the studio. Nature, however, provides a perfect background for most outdoor subjects, in the sky itself, which, by the aid of filters can be

A woolly skyline!

made to give almost any tone between the extremes of white and black, with the addition of beautiful cloud forms. Such a background can often be "arranged" by simply waiting a few minutes until the desired cloud rolls along!

There is, of course, some difficulty in getting the subject up against the sky, but often this can be overcome simply by choosing a low viewpoint. Animals in fields are often shown against unsuitable backgrounds of tree and foliage. The red cow in the green meadow, outlined in such beautiful contrast to the eye, can appear in almost identical tones on a photographic print, so the sky is often to be preferred when making such snaps.

In most country districts there are pleasant streams and rivers flowing between protecting banks. These banks are rented by local farmers for the purpose of grazing, and such spots make one of the very best sites for photographing animals against the sky. Animals often graze along the top of the bank, or can be gently coaxed to the top, where they are beautifully outlined against the clouds. It is a fairly easy matter for the photographer standing below to get as many exposures as he likes, making use of a medium yellow filter if white clouds are showing against a blue sky. I have had a lot of fun photographing farm animals in this way on our local river

Horse and Clouds. The illustrations to this article are from photographs by the author.

banks, choosing a day when there are plenty of suitable clouds in the sky.

Similar localities enable good portraits to be made against backgrounds of sky and cloud, especially with children, who can be posed among the yellow ragwort and other wild flowers growing there. The bank is often divided into sections by wooden fences, and friends can be posed naturally on these and snapped right up amongst the clouds. Quite often animals, or people, walking in single file along the top of the bank, or the crest of a ridge, make an effective picture.

When there are large areas of sky, take care when developing to avoid all marks and dust on the negative as these show up more prominently on skies. Filter all solutions, and dry in dust-free room. If unwanted blemishes do appear, spot them out with diluted black ink, or the special preparation sold at the dealers, using a fine camel hair brush.

On the river bank.

Railway Notes

By R. A. H. Weight

Coronation and Early Summer Traffic

Railwaymen as well as the many thousands of enthusiasts who watch locomotive and traffic working will be having a busy and also, I hope, a successful and interesting time about the date when these notes will be read. In quick succession there will be Whitsuntide, the Coronation with its vast additional passenger, excursion and Services' travel, and the opening of the summer services, providing new and faster trains.

On the occasion of the Coronations of King Edward VII in 1902 and King George V in 1911, several of the old separate railway companies specially named and decorated certain locomotives which were placed on show, afterwards hauling selected trains. In 1902 "single-wheeler" and small 4–4–0 engines were being largely used for express work, sometimes two at a time when loads were beyond the capacity of one. By 1911, 4–6–0, 4–4–2 and larger 4–4–0s were coming much more into the picture; corridor trains with dining cars had become usual. The railways were very busy and usually very enterprising.

When the Coronation of H.M. King George VI came along in 1937, the four grouped companies were well established and great strides had been made in locomotive size and capacity, as well as in average or fastest speeds and loads hauled. In commemoration of the event the L.N.E.R. and L.M.S. Railways inaugurated streamlined, high-speed flyers named respectively *Coronation* and *Coronation Scot*. The former ran between London, King's Cross, and Edinburgh, Waverley, the latter between London, Euston, and Glasgow, Central. The engines, like the beautifully appointed trains, were painted blue and were of the then latest streamlined Pacific type. Like several other very fast services of special character, these trains were withdrawn on the outbreak of war in 1939.

The moment for which everybody on the platform has been waiting; a Newcastle-King's Cross express arriving at Darlington behind No. 60091 Captain Cuttle. Photograph by R. E. Vincent.

Freight in Millions of Tons!

Despite some of the worst weather for several years, including an exceptional amount of fog, the Railway Executive reports that larger quantities of important freight traffic were handled during the past winter than in any comparable period since the war. Within approximately six months, over nine million wagons of coal were operated by rail, with nearly six million tons of home-produced iron and steel, 30,000 wagon loads of bananas, 10,794 wagon loads of Cornish broccoli and nearly 27 million tons of general merchandise. These impressive figures explain why on some sections of line goods or freight trains are much more frequent than passenger, and how important freight traffic is from the revenue point of view.

New Diesel-Mechanical Locomotives and Fewer Tools

An order has been placed with the North British Locomotive Co. Ltd., Glasgow, for three 0-4-0 diesel-mechanical shunting engines of 200 h.p. employing a system of hydraulic transmission avoiding the use of a gear-box. They are intended for the North Eastern Region.

Further standardisation of tools used in Works as well as by the permanent way men is taking place, to reduce the large number of different types now employed. More than a hundred assorted kinds are in use by the permanent way staffs, for instance. Mechanical aids and the best gear for the job will be provided wherever possible.

Eastern and North Eastern Regions

Five B12/3 former Great Eastern 4–6–0s have been transferred to Grantham for secondary passenger services lately worked by J6 0–6–0s, and for many years previously by Ivatt 4–4–0s. Class 4 MT 2–6–0s from the former M. and G.N. section moved to 34E, Neasden, include Nos. 43065–8, 43107, 43144, and 43161. Diesel-mechanical 200 h.p. shunters added to stock during March were No. 11106 to West Hartlepool, and Nos. 11108–10 to Parkeston.

Among the locomotives condemned and withdrawn from service is B17 4–6–0 No. 61624 *Lumley Castle*. The first two D10 Director 4–4–0s to suffer this fate are Nos. 62651 *Purdon Viccars* and 62657 *Sir Berkeley Sheffield*.

More express locomotives working on the Great Northern section are being fitted with automatic control apparatus, by which indication is given in the cab electrically as to whether distant signals are at clear or not, with a brake application if necessary. It is understood that a test of the apparatus now in use between New Barnet and Huntingdon was completely successful when *Mallard*, running fast with a 14-coach train and with the regulator open, was pulled up automatically within the section, as was the case when similar trials took place on the Western Region, which has a complete main line A.T.C. installation.

Classes Y6–7, 0–4–0T, have become extinct. Britannia 4–6–2s of the latest series reported at the time of writing were Nos. 70039 *Sir Christopher Wren* and 70040 *Clive of India* at Norwich; 70041, *Sir John Moore*, 70042, *Lord Roberts*, Stratford. B.R. class 4 2–6–0s Nos. 76023–4, built at Doncaster, were allocated respectively to Sunderland and Blaydon.

V2 2–6–2 No. 60845 has been on extensive trial at Swindon, including periods on the stationary testing plant there, subsequently making test runs on special

empty trains between Reading and Stoke Gifford, west of Badminton, with loads including dynamometer car, vans and bogie coaches in some cases exceeding 20 vehicles. Repainting and structural cleaning have greatly brightened King's Cross and Liverpool Street stations.

Southern Tidings

Drummond M7 0–4–4Ts have been used for the special pull-and-push workings between Faversham and Herne Bay during reconstruction of the main line and sea wall defences east of Herne Bay. Engines of this type have also worked from Brighton to Seaford. Nos. 80059–62, beginning a new series of class 4 B.R. 2–6–4Ts, were lately completed at Brighton. The previous batch finished with No. 80053. This year's programme includes 20 of this class.

No. 34107 is now named *Blandford Forum*. West Country or Battle of Britain 4–6–2s hauled special trains from Hastings, Eastbourne and Brighton to Wembley in connection with the Schoolboys' International football match. No. 30754 *The Green Knight*, one of the former L.S.W.R. Urie 4–6–0s, though classed with the King Arthurs proper as N15, was the first of these engines to be withdrawn.

Although some of the same types are being scrapped, certain T9, D or D1 4–4–0s, rebuilt Stirling 01 0–6–0s and 02 and E1 tanks have received what appeared to be general repair, with fresh paint in some cases.

B.R. No. 70021 Morning Star leaving Swindon for Banbury with a train of empty fish vans. Photograph by Dr. G. D. Parkes.

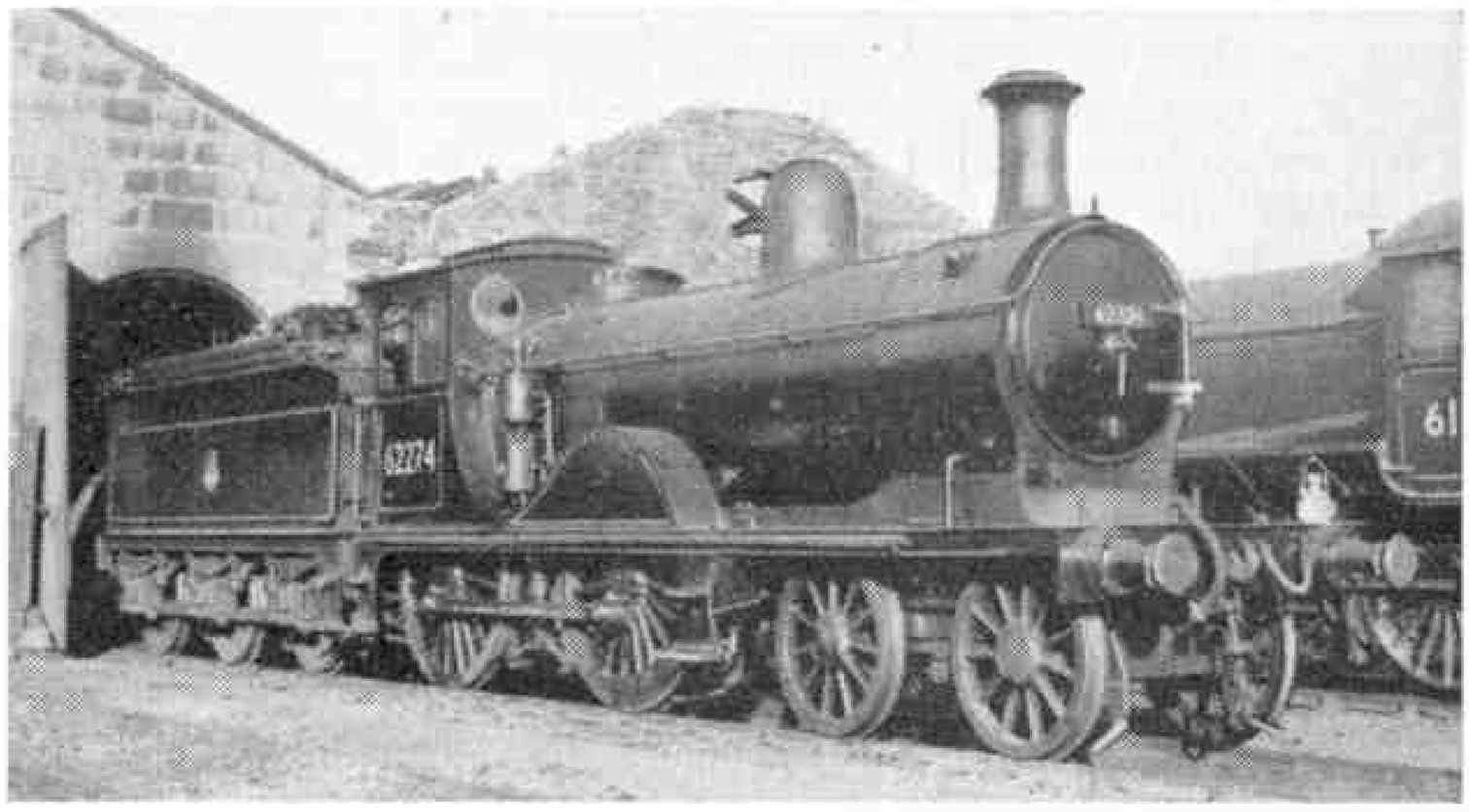
Some Good Runs: Express Logs Summarised

I have received several reports from reliable friends of excellent runs on various routes. The Jubilee 4–6–0 with double chimney, L.M.R. No. 45742 *Connaught*, of Bushbury, figured not long ago in a good journey of my own described in these notes. With 11 coaches on the 6.55 p.m. from Euston, a signal stop was suffered just outside the terminus, and later came a permanent way repair slowing after Bletchley, but Coventry was reached nicely within the 102 min. allowed for 94 miles, with a slight gain over the next 19 miles to Birmingham. Maximum speed was 77½ m.p.h. The same engine also did well on two runs with the 9.5 a.m. from Euston, with heavy trains for this class of locomotive on smart timings, there being station stops between London and Birmingham at Watford, Blisworth and Coventry. With 14 on, about 470 tons gross, time was gained decidedly to Blisworth, uphill speeds being good, the engine being quite master of the job, though a signal stop before Rugby prevented a punctual arrival. On the second trip, with a coach less, similarly good work prevailed throughout, much of the running being above the mile-a-minute average rate, providing ample promise of timekeeping and lively performances when the accelerated schedules come into force this summer.

For many years in the old days of the L.N.W.R. a 2–4–0 named *Charles Dickens* created fame by running with remarkable regularity from Manchester to Euston and back daily, building up a mileage in the course of years that was exceptional for those days. Now there is a new *Charles Dickens*, also stationed at Longsight, Manchester, of the vastly larger Britannia 4–6–2 type, which works to London and back. With 13 on, 430 tons full, a much greater load than her predecessor had to tackle, the 7P logged from Rugby to Euston most of the way nicely to time, being allowed only 89 min. for the 82½ miles. There were two track repair slacks and a signal check at Camden; net time was barely 87 min. and a maximum of 77–78 m.p.h. was attained down into the suburbs near Wembley.

On the Western Region, some examples of actual times no more than the 77-minute, 60 m.p.h. allowance for the 77¼ miles up from Swindon to Paddington, which is being introduced this month, were noted when the Bristol, etc., train then due in at 2.40 p.m. arrived on several occasions well before time. It had covered the 41¼ miles from the start to passing Reading in no more than 37–40 min., with 8–9 coaches in charge of a "Castle" or modified "Hall." On a Saturday, one of the older Halls with 11 on did almost equally well, demonstrating that with 380 tons or so behind the tender, and driving wheels only 6 ft. in diameter, a mile a minute could be maintained.

Nine minutes were gained on the 4¼ hr. timing from Paddington to Plymouth by the *Cornish Riviera Express* with winter load of 10 coaches, one of which was slipped en route. *King Edward II*, like *King Edward IV* on another recent occasion, passed Taunton, 142¾ miles, in little more than 141 minutes.



This sturdy little 4-4-0 of Scottish Region, No. 62274 Benachie, still retains the characteristic appearance that shows its origin on the former Great North of Scotland Railway. Photograph by C. Lawson Kerr.

Master Pilot No. 1

By John W. R. Taylor

MOST people think of aviation pioneers as dear old boys who risked their lives piloting stick-and-string flying machines at the time of the Wright brothers and Bleriot, 40 or 50 years ago. But there is still plenty of real pioneering to be done by men with courage and imagination, not only in probing the secrets of faster-than-sound flight, but by showing how aviation can make life easier and more enjoyable for all of us if it is used intelligently.

For that reason, Air Commodore Griffith J. Powell, C.B.E., Managing Director of Silver City Airways, is right at the top of my list of modern pioneers.

Sixteen years ago he was one of two Imperial Airways flying boat captains who made the first airline flights over the North Atlantic to New York. During the war, as a senior R.A.F. officer, he helped to organise Ferry Command, whose pilots delivered an unending stream of American-built warplanes to this country and, in doing so, confirmed the practicability of regular, all-the-year-round flying over the world's most formidable air route. And, since then, he has introduced a whole new concept of cheap, practical, safe air transport with his cross-Channel air ferry.

When I met him recently he had just returned from North Africa, after starting up a new airline for the Libyan Government—a fitting climax to a year in which he had taken over control of Aquila Airways, Britain's only flying boat operators, and ordered £1,500,000 worth of new aeroplanes for his own company. But, relaxed in an armchair by the fireside in his lovely home near Ascot, he seemed a million miles away from the world of big business—a typical British family man, happily married, with two fine sons, a cocker spaniel and his cars—and I did not doubt that this helped to explain his success.

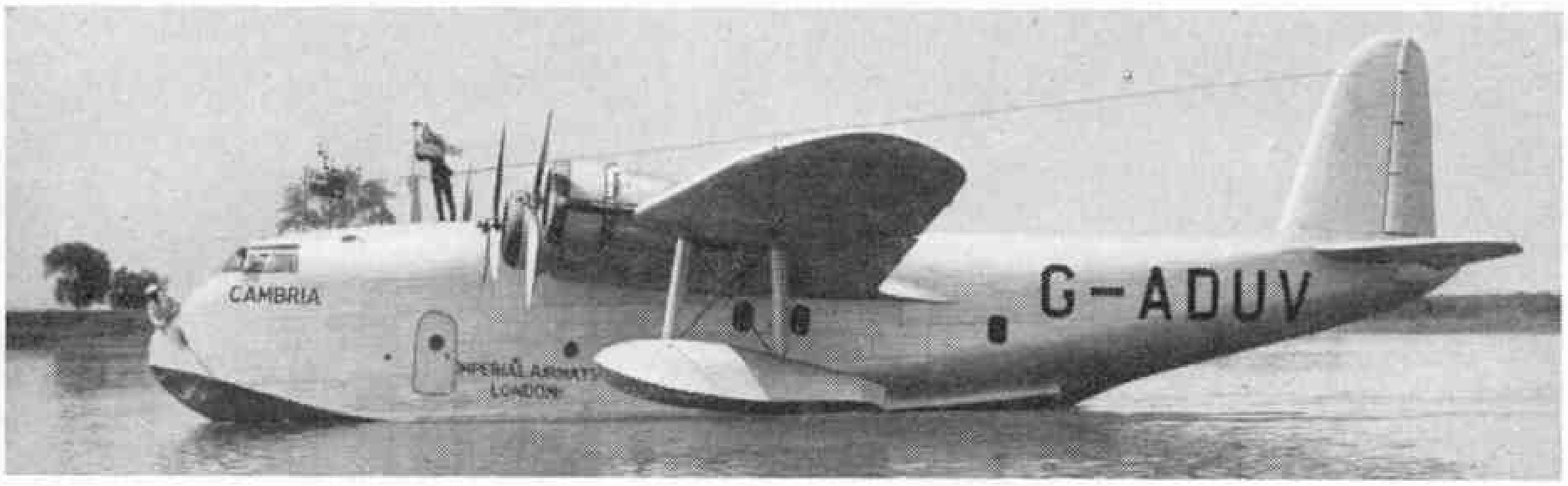
The cars were quite a coincidence. Three months ago I told you in *M.M.* about the 1903 Gladiator and 1906 Renault owned by record-breaking pilot Tom Hayhow, and among the first things the Air Commodore showed me at Ascot were his 1906 Swift and another car which he discovered submerged in a river and believes to be a 1900 Metz.

Most of Air Cdre. Powell's 14,000 hours of flying have been done in big, multi-engined aeroplanes. Admittedly, he put in a few hours on Avro 504 trainers when he first joined the Royal Air Force in 1926; but after that he went straight on to Vickers Virginia night bombers of No. 58 squadron, with such success that he was transferred to the R.A.F. Central Flying School as an instructor.

Air Commodore Griffith J. Powell, C.B.E., now Managing Director of Silver City Airways, who was the first to gain a Master Pilot's Licence endorsed for both landplanes and flying boats.

Fortunately for British civil aviation, he heard in 1929 that Imperial Airways were desperately short of experienced multi-engine pilots, got a special release from the R.A.F., and was soon in the cockpit of one of Imperial's Argosy air liners on the London-Paris run—the original *Silver Wing* service.

In those days, Imperial's captains had their own individual aircraft. So when the Company put into service its wonderful old Handley Page Hannibal four-motor biplanes in 1931, the then Captain Powell was given *Hadrian*, and in the next four years he flew it for more than 4,000 hours, chiefly in the Middle East,



Imperial Airways flying boat Cambria, one of the aircraft used in 1937 to pioneer the first airline route over the North Atlantic. Photograph by courtesy of Trans-Canada Air Lines.

without ever experiencing a mechanical breakdown.

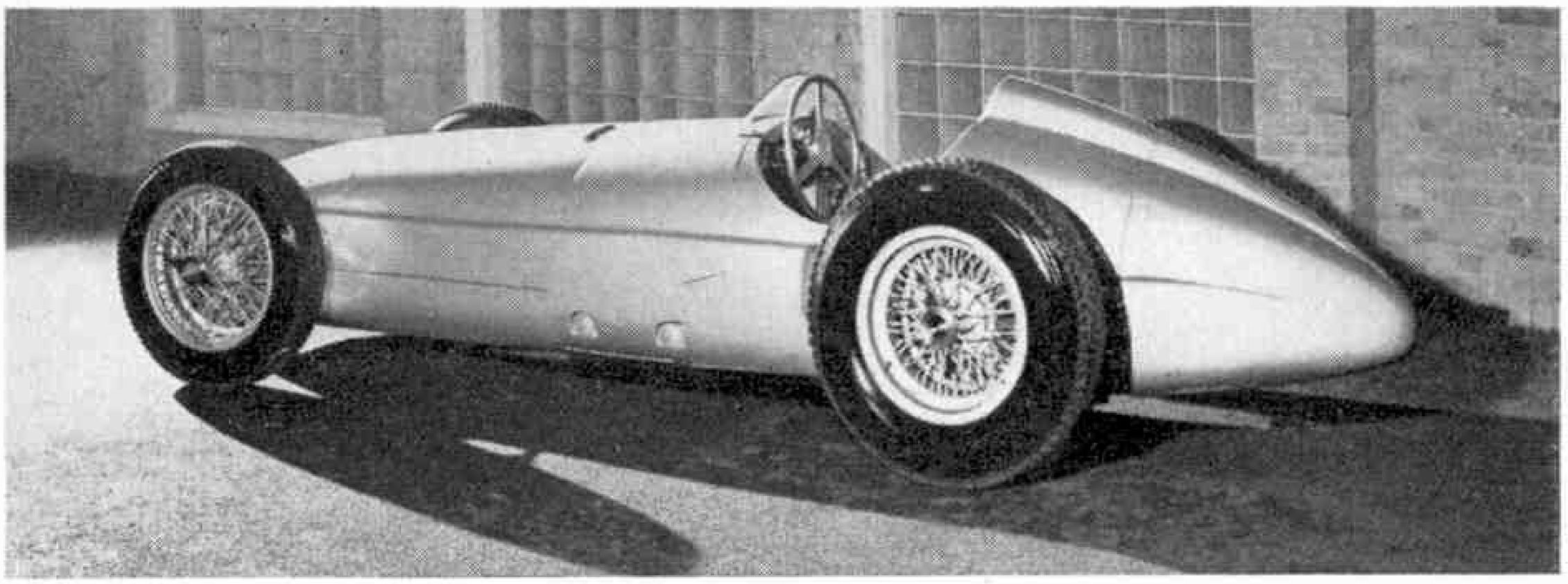
Between times, he did a turn on the biplane flying boats used on Imperial's Mediterranean service; and when the airline changed over to flying boats exclusively on all its trunk routes in 1936–7, he was chosen, with Captain Wilcockson, to pilot the specially-modified Short Empire 'boats *Caledonia* and *Cambria* with which Britain, in parallel with Pan American Airways, blazed the first airline route over the North Atlantic. Even before making these great pioneering flights, however, he was awarded the first Master Pilot's Licence — the supreme qualification for a commercial pilot— endorsed for both landplanes and flying boats.

When Imperials opened their dollar-earning service from Bermuda to America with the Empire 'boat *Cavalier*, Captain Powell was sent to New York as Manager of Imperial Airways (Bermuda) Ltd. He was in Canada when the war started, and was immediately commissioned to help organise the Canadian Air Training Scheme. After that he became Senior Air Staff Officer of, successively, R.A.F. Ferry Command and No. 45 Group, which formed the nucleus of Transport Command. But he was no "chairborne" commander, and made no fewer than 50 wartime Atlantic air crossings, some of them involving 20 hour non-stop flights from Bermuda to Greenock in Catalina flying boats. He also arranged many of the wartime flights made by Mr. Churchill and other V.I.P.s to Yalta, Potsdam and similar war conferences.

The story of how he left the R.A.F. on VJ-Day, formed Silver City Airways, took part in the Berlin Air Lift in 1948–9 and pioneered the world's first air ferry service for motor cars has already been told in *M.M.* It was a bold venture, which few people but the Air Commodore expected to succeed. Yet last year Silver City flew more than a million miles with their nine Bristol Freighters, carrying 10,910 vehicles and 28,500 passengers. This year, with many fares halved, bookings are up by 700 per cent., and Silver City are wondering if they will cope with the rush even with the help of their six new long-nosed Superfreighters, each of which can carry three small cars and 20 passengers.

By offering a new type of service at incredibly low rates, Air Commodore Powell is raising Silver City to the status of one of the world's great airlines. But the car ferry is only part of the story, for in North Africa the Company is operating Libyan Airways; in Germany it is engaged permanently on the new Berlin (*Continued on page 330*)

Transferring mail at Nairobi in 1934 from the Imperial Airways air liner Hadrian to an Atalanta southward bound and a D.H. Dragon destined for Mombasa.



On the Road

By J. Dewar McLintock

THAT thing generally called motor sport—a term that embraces a great variety of exciting and often somewhat dangerous activities—must be near the peak of its popularity again, after an upward climb from the austere days of war and immediate post-war restrictions on motoring as a whole. Indeed, the sporting calendar is so full this year that promoters are quite worried in case public attention becomes too much divided, and finances suffer. Promoters, that is the clubs, make very little out of racing at the best of times, surprisingly enough. However, I think we shall find that the great classic events are by far the most popular.

The most important and most exciting form of motor sport is road racing, and the Grand Prix events are the cream of the international calendar. This is a transition year where the racing formulæ are concerned. "Formula" refers to the capacity classes in which cars are raced. Up to the present, the existing Formula I, up to 1½ litres supercharged or 4½ litres unsupercharged, has been the "Blue Riband" class, but as it is to be changed in 1954 to 750 c.c. blown or 2½ litres unblown, everyone has turned to the existing Formula II, not just because it started to be very interesting within its own right a year or two ago, when small firms entered some very fast cars in this 2-litre class, but also because it now represents a wonderful sphere of development for the 2½-litre cars that will presumably dominate the road racing field when the new Formula I comes into use.

I have included a picture of this year's H.W.M. in this feature. Doesn't she breathe power? You know, the H.W.M. history is a wonderful one. I wish I had space to recount it in detail, but that is impossible, I am afraid. It all started in 1949, when Heath and Abecassis (who run Hersham and Walton Motors—hence the initials), entered for sports car races with the first models. They soon found out that the cars were fast enough for the racing class, however, and indeed in many cases they have done well even against Formula I Grand Prix cars, giving away 2½ litres! Incidentally, our friend Stirling Moss was a member of the original team.

There is something about the B.R.M., shown in the illustration at the head of the page, that suggests "rightness," despite the fact that things were anything but right for it in its first few years. It looks really potent, and may yet prove to be a world-beater.

You see here, too, a picture of a B.R.M. What are we to think about the B.R.M.? It is not easy to forget the years of bitter frustration and ill-luck, but no one dare say "This motor car is a failure." The speed and power are almost uncanny, when they are usable. Every racing driver who has tried the car has been filled with admiration—even if he has promptly broken it, like a certain foreign ace in 1951! The cars now belong to Mr. Alfred Owen, of the Rubery Owen engineering group, and it can be taken that if they have shown the promise he expects, they will form the basis for something intended for the new formula.

As things stand at present, the Italians ought to be having things very much their own way, with their astonishingly fast and powerful Ferrari and Maserati cars, but we have certain two-litre motor cars which do not hang about . . ! In the Free Formula classes many interesting dog-fights still take place, too.

There are the sports cars to think about

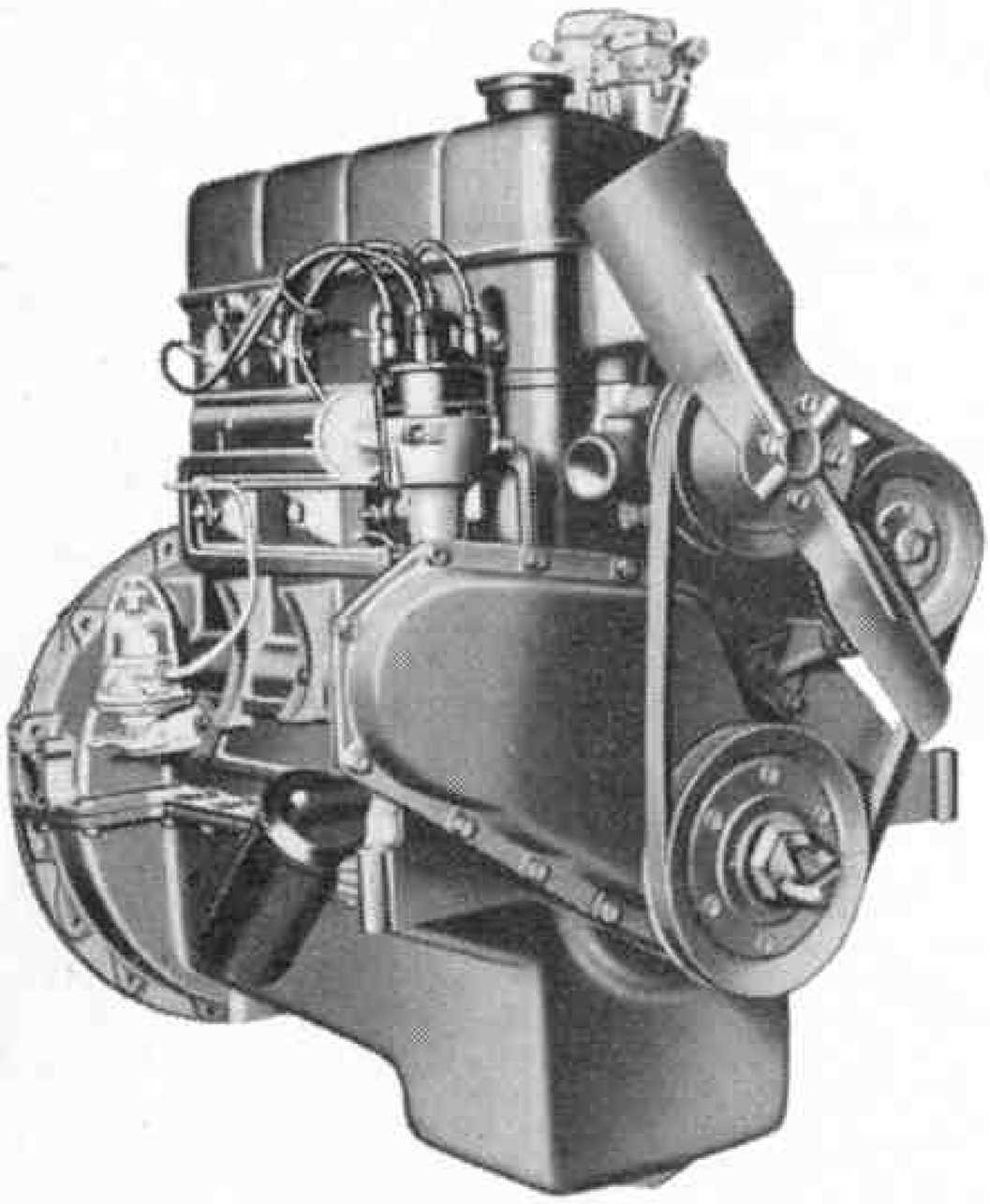
too, and with Le Mans near ahead, 13th and 14th June, all the enthusiasts are weighing up the possibilities of new cars like the 3-litre Astons and the "flying saucer" Alfas, a new Allard and a Frazer-Nash of 3½ litres, etc.

That Allard is a honey. It has the Cadillac V-eight engine and is slimmer, smaller and lighter than the J2X Allard that has done so well. Two examples will race at Le Mans, I am told.

The Americans are now well on the map in sports car racing, of course. Their own Sebring race, which took place right at the beginning of the season, was in the tradition of British racing. The American Cunningham won the race, and it is this make that will have to be watched at Le Mans.

Now a word or two about championships. Somebody has asked me what the championships are, and how they are decided. It is a question which cannot easily be answered in brief, for regulations in each case are long and involved screeds, but I will do my best to present a general picture. Where road racing is concerned, the most important one is the European Championship, and it is won on points gained in the major Grand Prix, or Grandes Epreuves, as they are commonly known. There is also a British form of championship, the B.R.D.C. Gold Star award, and this is based on points gained in the more important events, plus Le Mans and the Mille Miglia. Then there is a hill-climb championship sponsored by the R.A.C., and the events which count are Shelsley, Prescott, Rest-and-Be-Thankful, Bo'ness, Tregantlet and Bouley Bay climbs. There is also an R.A.C. trials championship, but that is decided in the winter season, while a new sports car championship—in which manufacturers and not drivers will be concerned—is under way. In all cases points are docked or awarded on various accounts, such as wins or places, lap speeds, or failure to finish within a certain time.

The 1953 H.W.M. 2-litre racing car. This make owes its existence to the determination of a small and formerly unknown engineering concern a few miles out of London.



The new Thames four-cylinder overhead-valve "Cost Cutter" engine produced by the Ford Motor Co. Ltd. This unit is revolutionary not only because of its excellent specification, but because it challenges Fords' own well-tried V eight.

Finally, and on another subject altogether, you will see a picture of a new Ford lorry engine here. This was introduced recently, and is called the Cost Cutter, because its mechanical features are aimed at full efficiency of operation as well as at long life. For example, the cylinders have easily-changed liners, so that reboring is never needed.

BOOKS TO READ

Here we review books of interest and of use to readers of the M.M. With certain exceptions, which will be indicated, these should be ordered through a bookseller.

"HER MAJESTY'S CORONATION" A SOUVENIR

This souvenir takes the form of an illustrated booklet, with pages measuring 11 in. by 8 in., issued in aid of the National Playing Fields Association. It is a beautiful production, mostly in colour, that describes briefly the Coronation Service in Westminster Abbey and also deals shortly with outstanding features of Her Majesty's career and her associations with Scotland, Wales, Cornwall and Northern Ireland.

The pictures are excellent, including many of Her Majesty, the Duke of Edinburgh and the Royal children. Other subjects include the scene of the Coronation and the Regalia, and there are also illustrations of London, Edinburgh, Caernarvon and Belfast, and of the Queen's homes. A map of the world, adorned with flags and crests, makes clear Her Majesty's position as Head of the Commonwealth.

As explained in a foreword by Lord Luke, Chairman of the National Playing Fields Association, the souvenir is a mark of gratitude to Her Majesty, who is the patron of the Association on behalf of which it is being produced. It is handsomely bound in a blue cover, in which there is a handsome souvenir medallion suitably inscribed. It can be obtained from newsagents, booksellers and at bookstalls, price 2/6.

"BRITISH RAILWAYS LOCOMOTIVE TESTING BULLETIN No. 4"

This addition to the series of British Railways Locomotive Testing Bulletins, referred to in the *M.M.* for October last year, deals with official tests made with a B.R. Standard class 4 mixed traffic 4–6–0 locomotive. The results obtained both on the road and on the stationary testing plant at Swindon are, for the most part, given in a series of tables that will be of considerable interest to the locomotive student. Copies of the Bulletin can be obtained from the Publicity Officer, Railway Executive, Room 323, 222 Marylebone Road, London N.W.10, price 10/- each including postage.

"CAMPING FOR ALL"

By Jack Cox (Ward Lock 12/6)

This book, by the Editor of the *Boys' Own Paper*, is intended both for those who have little or no experience of camping and for old hands anxious to improve their technique. After describing the main types of camp, the author gives sound advice on choice of kit, selection of camping site and the best way to pitch and strike camp. The advantages and disadvantages of solo, short-period and standing camps are gone into fully, and such important matters as clothing, food, water supply and hygiene are covered in detail.

The book is illustrated with 70 excellent photographs and 50 diagrams.

"THE BOYS' BOOK OF CRICKET FOR 1953"

Edited by Patrick Pringle (Evans 10/6)

Here is the fifth edition of this now firmly established Annual, and the high standard of the previous issues is well maintained. The mixture is as before, with lively articles by famous cricketers giving either valuable advice to youngsters intent upon improving their play, or indulging in delightful reminiscences of great games in which the writers have taken part. Among the great men of cricket who have contributed in this way are Len Hutton, Roly Jenkins and Herbert Strudwick, the famous former English wicket keeper. H. S. Altham, Chairman of the M.C.C. Youth Cricket Association, tells boys what the Association means to them, and Alan Fairfax, the famous Australian Test player, who is Secretary of the Young Cricketers' Advisory Coaching Council, describes his methods of coaching English boys. Godfrey Evans answers twenty questions in his usual lively style.

Naturally there is a strong Australian "flavour" to the contents of this edition. Two pace bowlers write on cricket in that country, Ray Lindwall recalling his early cricketing days and Alec Bedser recounting what he has seen of country cricket "down under." E. M. Wellings gives an analysis of recent Australian tours in England.

In lighter vein there are, as usual, cricket stories, quiz pages and crosswords. The book is illustrated with many fine photographs of famous cricketers, cricket grounds and scenes from notable matches.

"THE VAN AND KERRY RAILWAYS"

(Lewis Cozens 5/8)

Here are detailed histories of two local Welsh railways. The Van Railway owed its origin to lead mines and with their decline the railway went out of action. It was worked by the former Cambrian Railway after 1896 and passed to the G.W.R. at grouping in 1923. The Kerry Railway, now a Western Region branch, runs from Abermule, on the Oswestry-Aberystwyth main line, up to Kerry in the hills. Its passenger services have long been discontinued, but the line still operates freight traffic on the "one engine in steam" principle.

A great deal of information concerning these little systems is packed into the book, which for its size contains a fair number of illustrations. Those readers who follow the history of small railways and their general topography will find plenty to interest them in its 40-odd pages.

Copies can be obtained by post only from the author at 25 Cholmeley Crescent, Highgate, London N.6, for 5/8 including postage.

"MOTOR CYCLING YEAR BOOK 1953"

(Temple Press 8/6)

Readers keenly interested in motor cycling will find in this new edition of this popular Annual a full review of the preceding year's activities throughout the whole field of motor cycling. It includes chapters on technical trends, foreign touring, and a detailed analysis of progress in racing design. There are tables dealing with the world road racing championships and the A.-C.U. "Star" contests, road tests, specifications and prices of current models; and nine chapters are devoted to individual aspects of the sport, including speedway racing.

The book is illustrated with many half-tone photographs of famous motor cyclists and racing events, and with line drawings showing technical details of current machines.

"THE BOOK OF SCIENTIFIC DISCOVERY"

By D. M. Turner (Harrap 12/6)

Dr. Turner covers an immense amount of ground in his book, for in its 280 or so pages it covers the whole field of the history and growth of science, while dealing also with its applications in industry, transport and indeed in all aspects of our daily lives. Naturally the story is a little crowded with material, but for the boy who has the patience and the desire to learn exactly how his modern world has come into being it will provide a wealth of knowledge, and it will encourage original thinking on his part.

The book is amply illustrated, containing 31 full page plates and many illustrations in the text itself. It is well written, although the compression that has been necessary makes the reading somewhat hard going for younger readers.

A Page for the Very Young

A New Dinky Builder Model

MANY Meccano and Hornby Train enthusiasts and other readers of the *M.M.* have younger brothers and sisters whose pastime is building with the popular Dinky Builder Outfits. These older readers feel that while the *M.M.* provides for their interests very well, it would be a good idea to include now and again a page or two of new Dinky Builder models that would be of interest to the youngsters.

Unfortunately up to now space in the Magazine has not permitted this, but with the larger issue now possible it is hoped to include, from time to time, pictures and details of new models specially designed for Dinky Builder Outfits. Although we cannot make this a regular feature, we shall do our best to include a page for Dinky Builder owners as often as possible.

A new model appears on this page. No doubt many young Dinky Builder enthusiasts will not yet be able to read, but they will be able to rely on their elder brothers and sisters or parents to explain to them the following notes regarding the model.

This model does not appear in the Instructions Books packed with the Dinky Builder Outfits, and we are sure all young boys and girls will enjoy building it and playing with it. It can be built from Dinky Builder Outfit No. 2 or No. 1 and 1a Outfits combined.

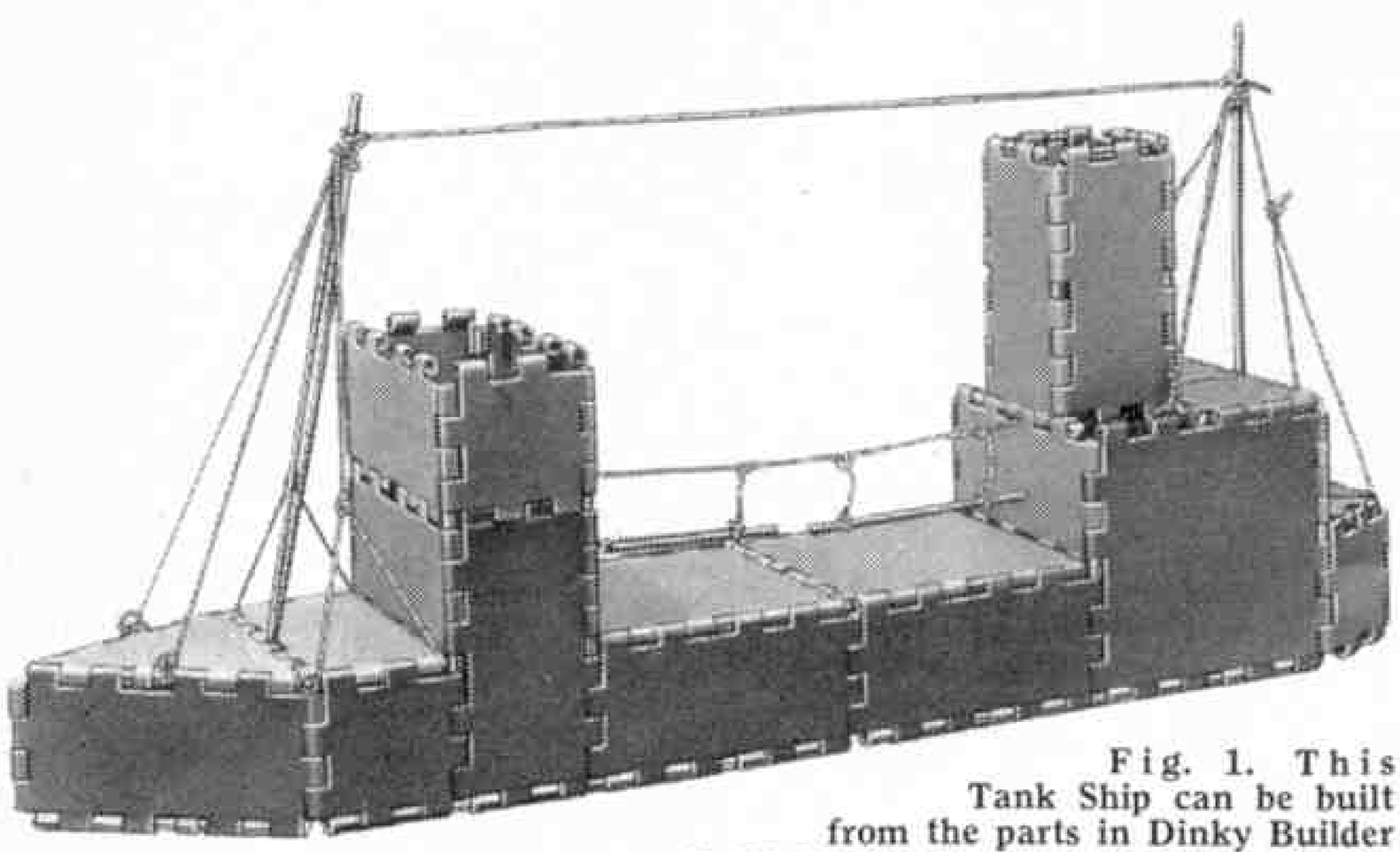


Fig. 1. This Tank Ship can be built from the parts in Dinky Builder Outfit No. 2.

The model represents one of the great tank ships used for carrying crude oil. The oil is stored in huge tanks formed in the amidships portion of the vessel's hull The boiler and engines, or other type of machinery used for propelling the ship, are placed at the stern end, and in the fore part are the quarters of the crew.

The base of the oil tanker consists of a large Triangle, two Large Squares (yellow) and two Large Squares with Windows. The deck at the stern of the vessel is assembled from three Small Triangles (blue). The upper half of the rear of the bridge is made from two Small Squares (yellow), and the raised deck behind the funnel is made by joining two Small Squares (blue) together.

The foremast is a $4\frac{7}{8}$" Rod, and it rests on the portion of a $2\frac{1}{2}$" Rod that shows in the gap between the Large Triangle and the Oblong (yellow) that form the fore deck of the model. The aft mast is a $3\frac{1}{2}$" Rod that fits over the visible portion of a $2\frac{1}{2}$" Rod in the same way as the foremast. Three sides of the funnel consist of Oblongs and the fourth one of two Small Squares.

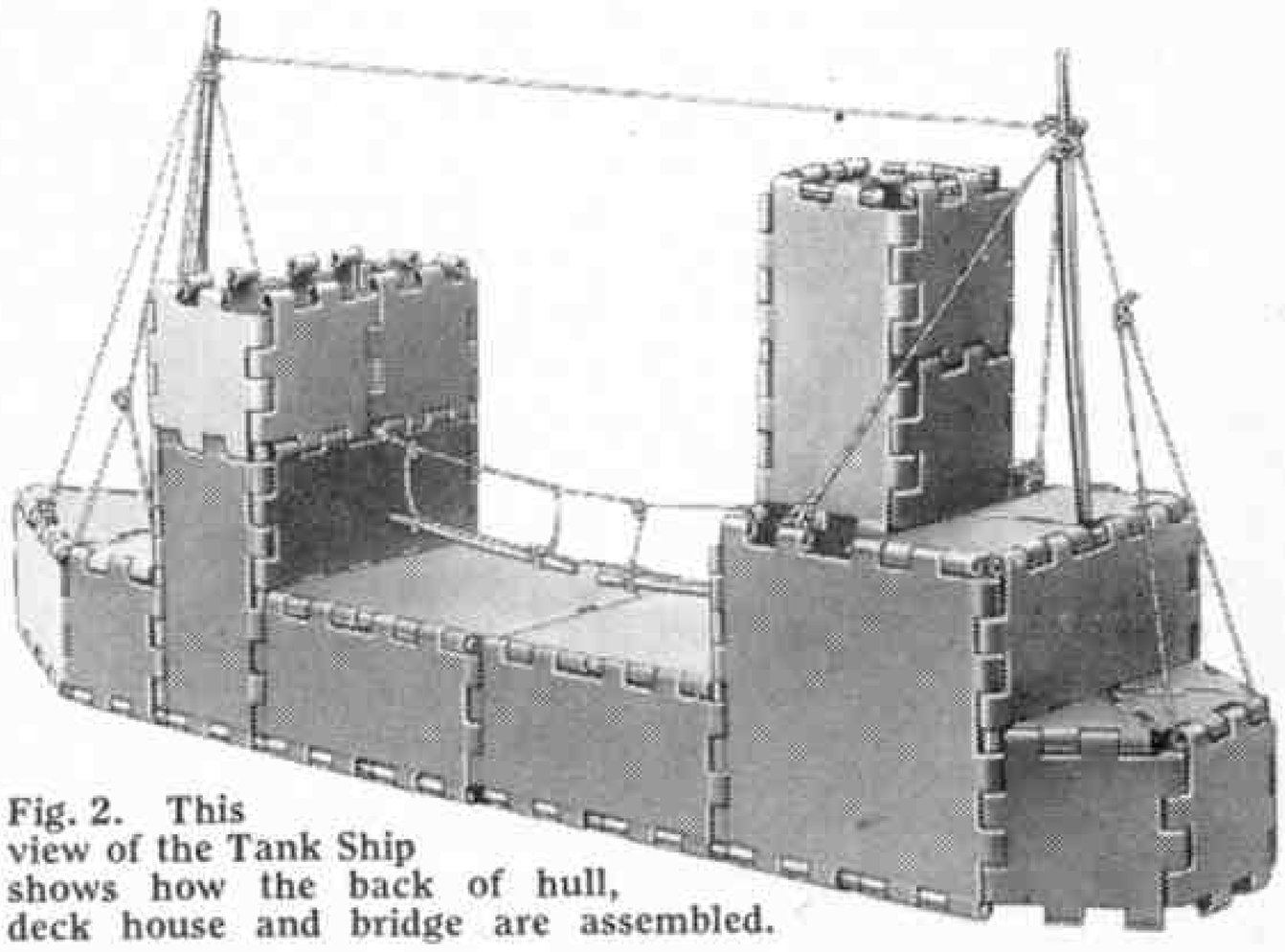


Fig. 2. This view of the Tank Ship shows how the back of hull, deck house and bridge are assembled.

Among the Model-Builders

By "Spanner"

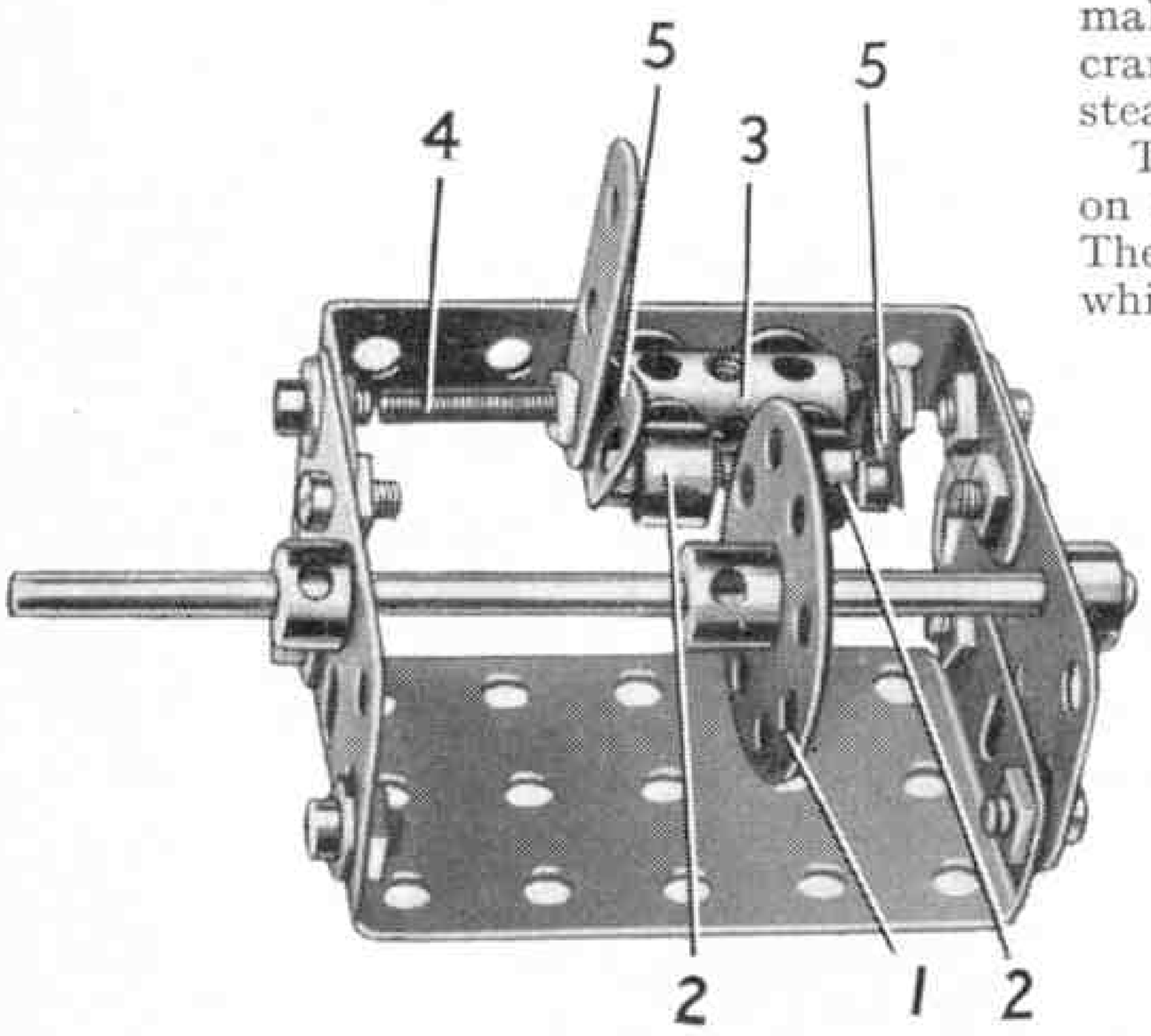


Fig. 1. A disc brake device suitable for use in model cranes.

Disc Brake

Many model-builders specialise in their choice of subjects, and I know of several who continually build nothing but cranes of various kinds. Much of the fun and interest obtained from specialising in this way comes from the scope for variation that is provided in designing the various essential parts of the equipment such as brakes, clutches, gearboxes, etc. Brakes particularly give ample scope for the exercise of constructional skill and ingenuity in design, and as a further addition to the many that have already been described in these pages, I am including a disc type of brake that makes an interesting variation from the internal expanding and strap brakes usually fitted to models. It is shown in Fig. 1 and it gives a powerful braking effect that is applied smoothly and progressively. If required the operating lever can be spring loaded so that the brake remains "on" until the lever is moved. The smooth action of this brake makes it particularly suitable for use in cranes, as it enables the load to be lowered steadily under absolute control.

The brake disc is a Bush Wheel 1 fixed on a shaft mounted in suitable bearings. The brake shoes are two $\frac{3}{8}$" Bolts, each of which is passed through a Collar 2. The grub screw of each Collar is partly unscrewed and the portion outside the Collar is screwed into the threaded hole of a Coupling 3. The Collar is then turned until it is locked tightly against the Coupling.

The Coupling 3 is attached to a suitable framework by two bolts, each of which is fitted with two Washers so that the bolt does not project into the bore of the Coupling. A 2" Screwed Rod 4 is passed through the Coupling, and a Fishplate 5 is fixed on the Rod at each side between two nuts. The Fishplates are twisted slightly, so that they can act as cams against the heads of the $\frac{3}{8}$" Bolts used as the brake shoes. The operating lever is a $1\frac{1}{2}$" Strip, and when it is moved the Fishplates force the $\frac{3}{8}$" Bolts through the Collars until they bear against the face of the Bush Wheel.

A Neat Friction Clutch

The miniature clutch unit shown in Fig. 2 is small enough to be fitted to model

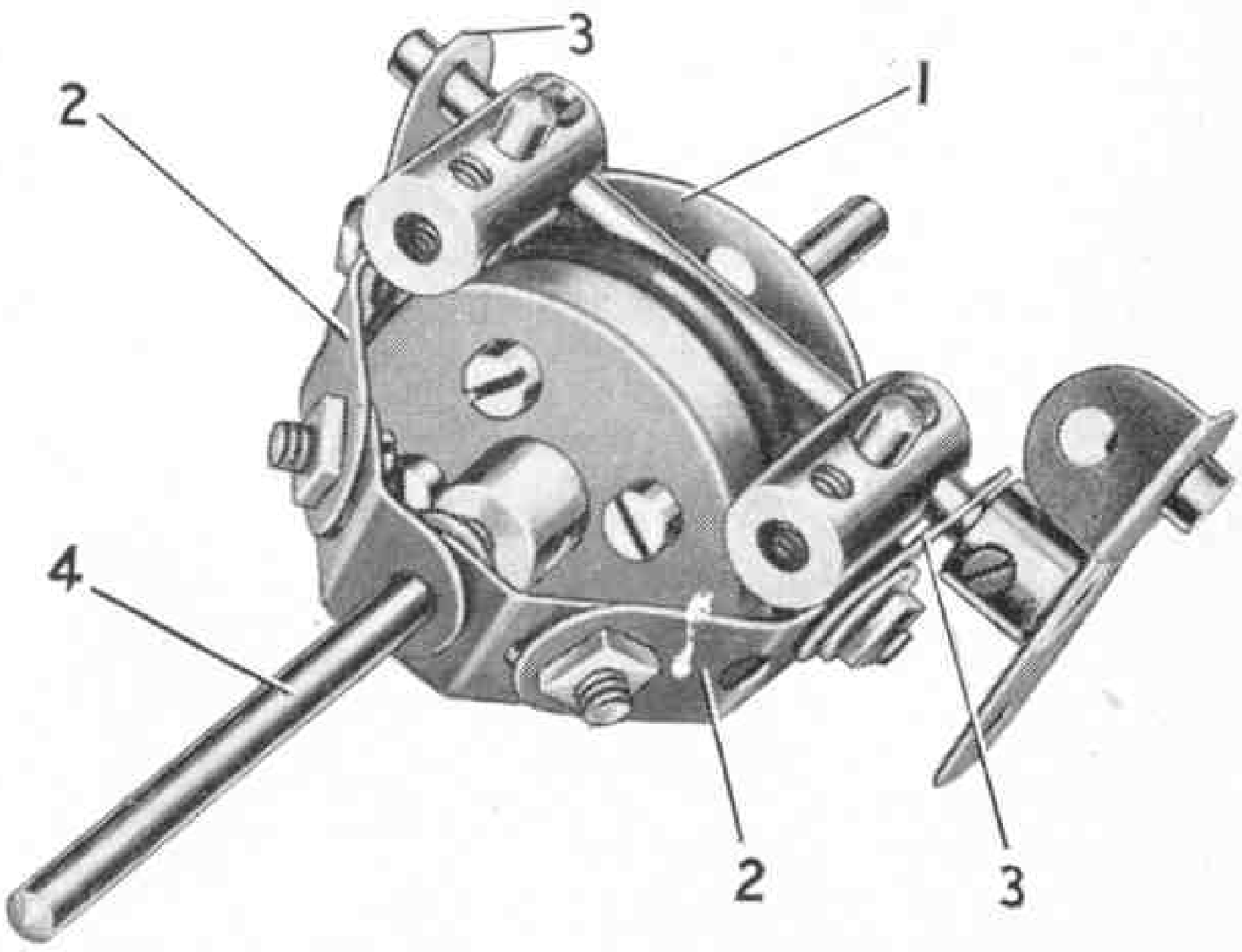


Fig. 2. A small friction clutch unit designed for use in models where space is limited.

vehicles where little space is available to accommodate all the essential features of a highly detailed model. In spite of its small size however, the unit will take quite a powerful drive without slipping, and one of its features is a novel substitute for the splined shaft used in an actual clutch to ensure that the sliding member rotates with its shaft.

The casing for the unit consists of a Wheel Disc 1 fitted with two Angle Brackets. A 1½" Strip 2 is bolted tightly to each Angle Bracket, and the bolt fixes also a Fishplate 3. Obtuse Angle Brackets are bolted to the 1½" Strips, and the free holes of these Brackets form the bearings for the output shaft 4.

The input shaft carries a 1" Pulley fitted with a Rubber Ring, but it extends only part of the way into the boss of the Pulley. The free portion of the boss therefore can be used to provide the inner bearing for the output shaft. The Pulley is fixed by its set-screw to the input shaft, but the shaft 4 is free to rotate.

A 1⅛" Flanged Wheel is loosely mounted on shaft 4, and its rim is forced against the Rubber Ring on the 1" Pulley by a Compression Spring fitted between the boss of the Flanged Wheel and the Obtuse Angle Brackets. A Bolt is fixed in each of the holes in the Flanged Wheel, and these engage Bolts in a Collar fixed tightly on shaft 4 between the Flanged Wheel and the 1" Pulley. The action of these Bolts ensures that the Flanged Wheel rotates with shaft 4, but it can be slid to the rear against the pressure of the Compression Spring.

The withdrawal pedal is a Double Arm Crank fixed on a Rod mounted in the Fishplates 3. This Rod is fitted with two Couplings, and 1" Rods held in the Couplings bear against the flange of the Flanged Wheel.

Fig. 3. The Rev. G. H. Retief, Elsburg, Transvaal, photographed with his model of an Albion Chieftain Lorry.

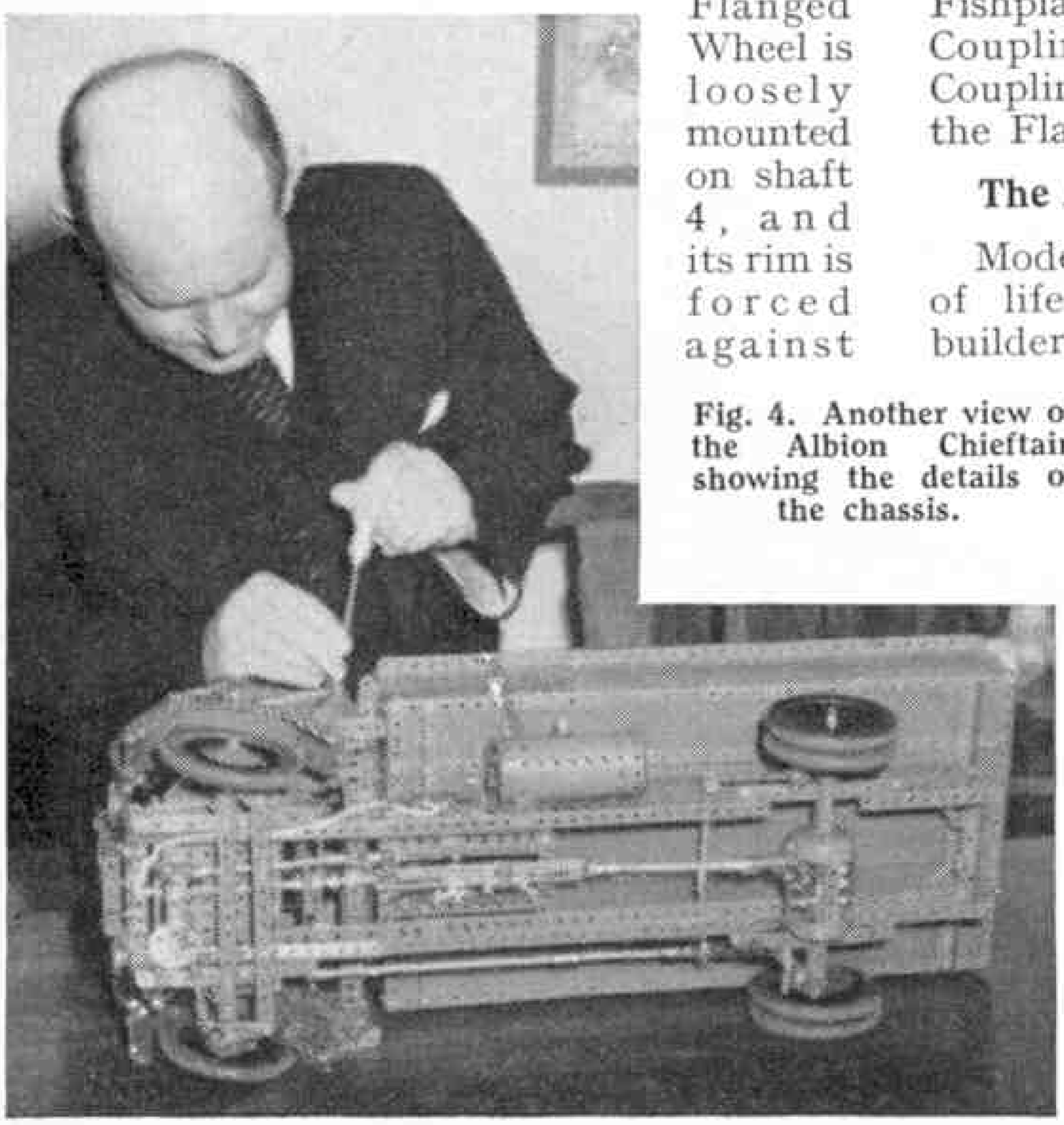


Fig. 4. Another view of the Albion Chieftain showing the details of the chassis.

The Albion Chieftain Lorry in Meccano

Model makers are to be found in all walks of life and especially Meccano model-builders, and one of the latest instances of this came to my notice recently when I received details of a fine model of an Albion Chieftain lorry built by the Rev. G. H. Retief, of Elsburg, Transvaal, South Africa. The model, together with its builder, is shown in accompanying illustrations, and is complete with steering gear, four-speed gear-box, clutch and differential. It will be noticed that the model is remarkably neat and clean in outline, and it has a solidarity of appearance that is sometimes lacking in models of this type based on modern heavy goods vehicles.

Two "Easy-to-Build" Models

By "Spanner"

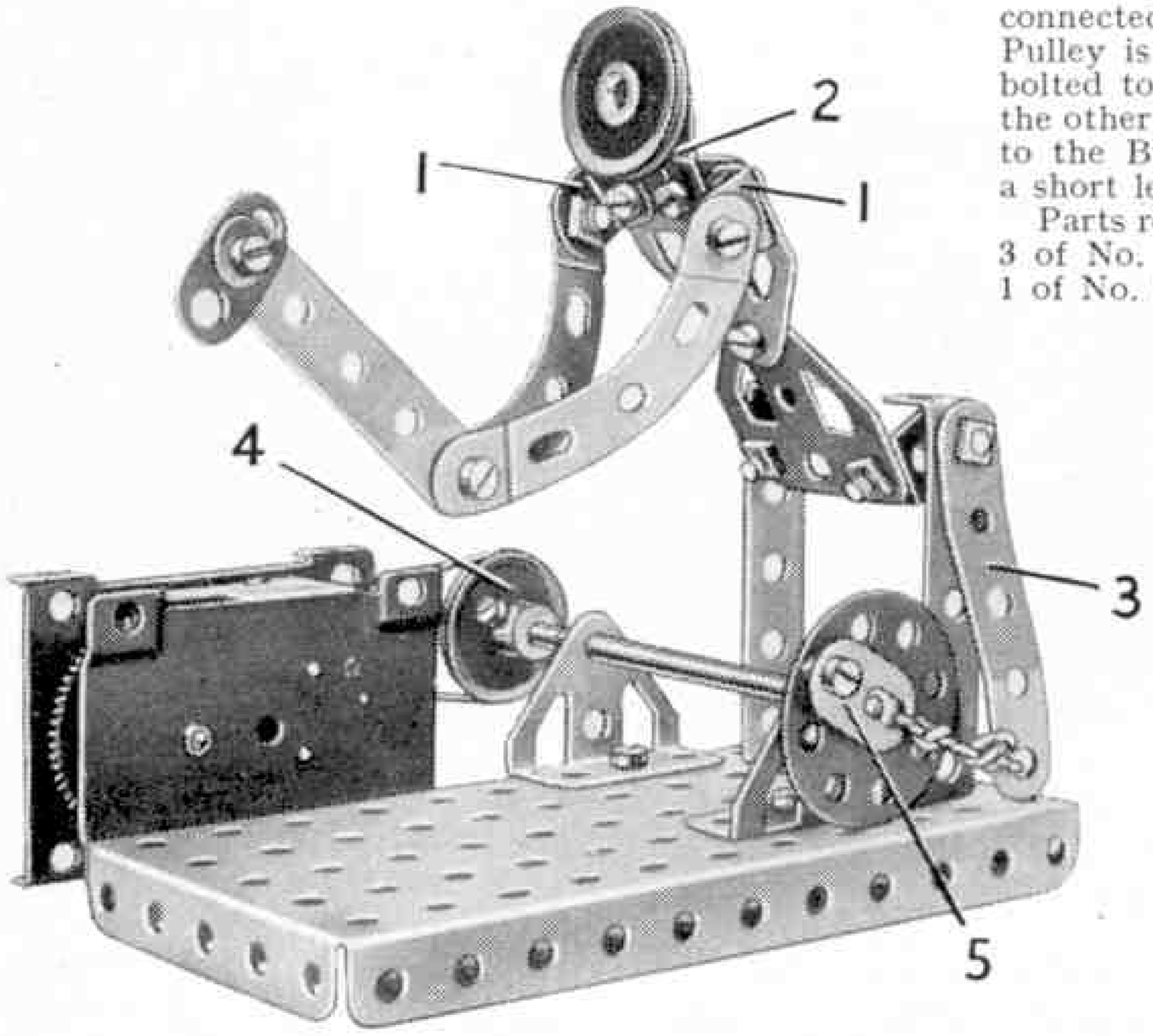


Fig. 1. "Rocky, the road repairer." This simple working model can be built from Outfit No. 0.

ROAD NAVVY—MOVABLE CRANE

Some years ago I illustrated in the *M.M.* several very simple workable models representing people engaged in various tasks or sports. I was very pleased to find that these proved very attractive to my younger friends and I received lots of letters asking me to design some more models of this kind. I am always glad of course to meet the wishes of my readers as far as possible, and therefore I have designed another mechanical figure that I hope they will like. This one is the result of my efforts recently to amuse a young relative who was paying a visit to my home. It represents a road navvy at work, and is most amusing to watch in action when it is set working by the *Magic* Motor with which it is fitted.

The man's legs are 2½" × ½" Double Angle Strips, and it will be seen that they are bolted direct to a 5½" × 2½" Flanged Plate that forms a base for the model. Two Flat Trunnions bolted together at their pointed ends represent his body, and his arms are 2½" stepped Curved Strips attached to Angle Brackets 1. The hammer is a 2½" Strip with a Fishplate for a head, and it is bolted between the ends of the man's arms. The 1" Pulley representing the man's head is fixed by its set-screw on a bolt passed through a Fishplate 2.

An Angle Bracket is bolted through its round hole to each corner of the lower Flat Trunnion, and in its slotted hole a ⅜" Bolt is fixed by a nut. The Bolts are then passed through the upper holes of the 2½" × ½" Double Angle Strips and fitted with lock-nuts, so that the man's body is able to move freely on the legs. A 2½" Strip 3 is clamped tightly to one of the ⅜" Bolts by the lock-nuts.

To complete the model the *Magic* Motor is bolted in position and its pulley is connected by a Driving Band to a 1" Pulley 4. This Pulley is fixed on a 3½" Rod mounted in Trunnions bolted to the base, and a Bush Wheel is fastened at the other end of the Rod. A Fishplate 5 is lock-nutted to the Bush Wheel, and is connected to Strip 3 by a short length of cord.

Parts required to build the Road Navvy: 2 of No. 5; 3 of No. 10; 4 of No. 12; 1 of No. 16; 2 of No. 22; 1 of No. 24; 1 of No. 35; 18 of No. 37; 4 of No. 37a; 2 of No. 38; 2 of No. 48a; 1 of No. 52; 2 of No. 90a; 2 of No. 111c; 2 of No. 126; 2 of No. 126a; 1 *Magic* Clockwork Motor.

AN ATTRACTIVE MOBILE CRANE

Of all the many different models it is possible to build with Meccano, I doubt if any has greater interest for a youngster, than a crane! How well I remember in my own young days, the fun I got from building and playing with simple Meccano cranes! I am afraid some of my early efforts were a bit rickety, because I always wanted to have a tall jib, and to build this from my small Outfit I had to use up nearly all my parts and so had hardly any left to provide a good steady supporting structure! However, rickety and spidery though they were, my cranes gave me lots of fun. I remember that I used to perch them on the edge of a table so that I could hook up small objects off the floor, and how exasperated I was when after raising the load almost to table level the Cord slipped on the winding handle and down it crashed again, often taking the crane itself along with it! I feel sure that this will not happen with the simple three-wheeled crane I am illustrating in Fig. 2. I have designed this so that every owner of an Outfit No. 3 can make it, and I can assure you that it is quite strong and workmanlike.

The main piece of the model is a 5½" × 2½" Flanged Plate fitted at the front with a 2½" × 2½" Flexible Plate. This Plate

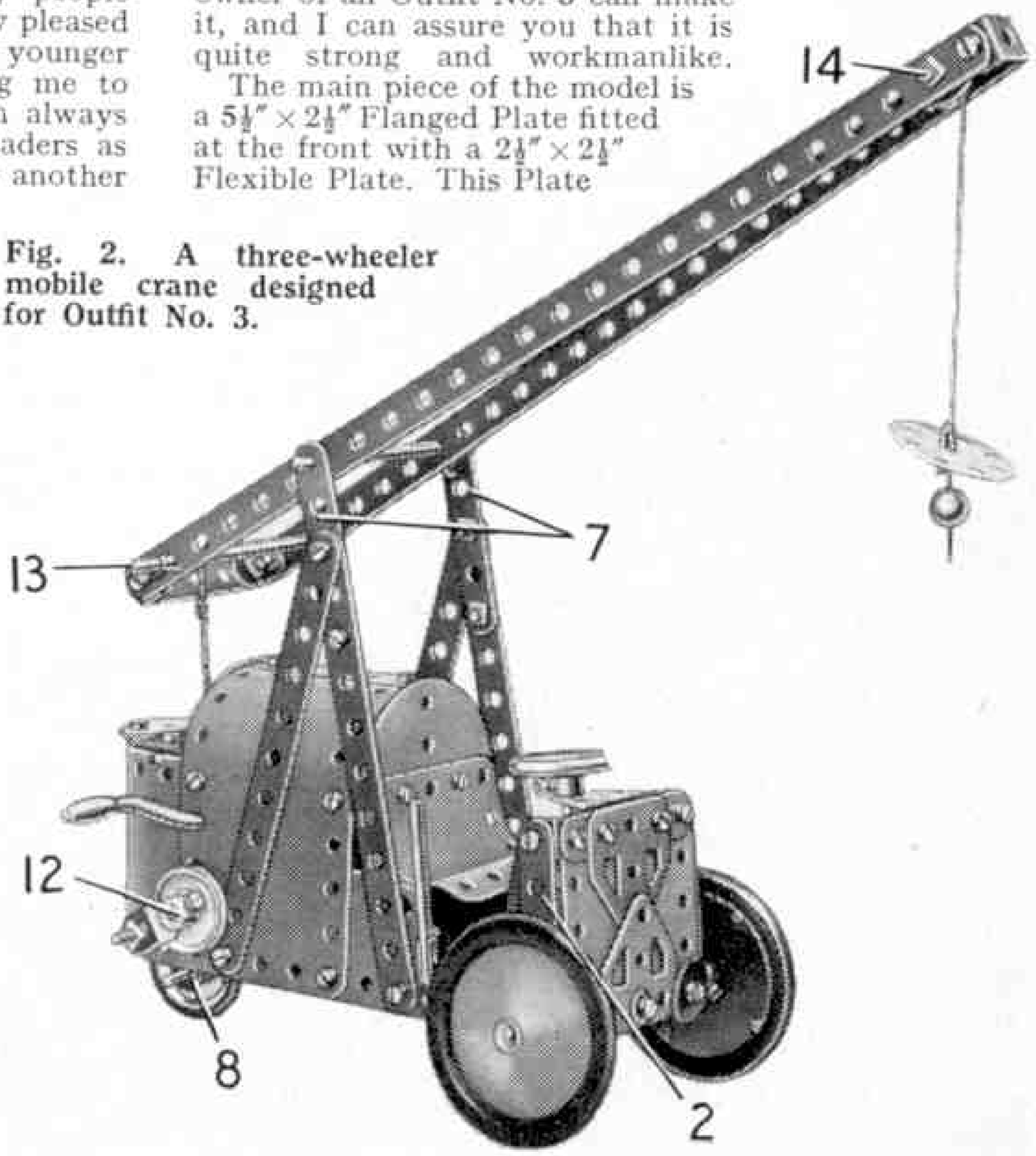


Fig. 2. A three-wheeler mobile crane designed for Outfit No. 3.

is braced along its top edge by a 2½" Strip, and it is connected by Angle Brackets to two 2½" Strips 1 and 2 on each side. The Strips 1 are bolted to the side flanges of the Flanged Plate, and the front axle, a 3½" Rod, is passed through Strips 2 and the end holes in the flanges. A Trunnion 3 is fixed to the Flexible Plate as shown in Fig. 3.

Each side of the body is made from a 2½" × 1½" Flexible Plate 4 and a 4½" × 2½" Flexible Plate 5. The upper ends of the 4½" × 2½" Flexible Plates are curved similar to a Semi-Circular Plate, and are bolted together, and two 2½" × ½" Double Angle Strips are fitted between the Flexible Plates by bolts 6 on each side. The bolts holding the Flexible Plates to the Flanged Plate are used also to fix two 5½" Strips, extended by 2½" Strips 7, to each side. A 5½" × 2½" Flexible Plate is curved and used to form the rounded end of the model.

The rear wheel is a 1" Pulley fitted with a Rubber Ring, and is fixed on a 1½" Rod supported in a Stepped Bent Strip 8. A ⅜" Bolt held tightly by a nut in the Bent Strip, is then passed through a Trunnion 9 bolted to the rear end of the Flanged Plate. A Wheel Disc 10 is gripped between two nuts on the shank of the Bolt coming through the Trunnion.

The model is steered from a 3½" Rod passed through Trunnion 3 and the Flanged Plate. This Rod is fitted with a Bush Wheel 11 and is held in place by a Spring Clip. The Bush Wheel is connected by a short length of Cord at each side to the Wheel Disc 10.

The jib uses two 12½" Strips, joined at the front by a Double Bracket and connected at the rear by Angle Brackets to a 2½" Strip. It hinges on a 3½" Rod, which is passed through the end holes of Strips 7, and held by Spring Clips.

The jib can be raised and lowered by turning a 4" Rod 12. The Rod is fitted with a 1" Pulley, to the boss

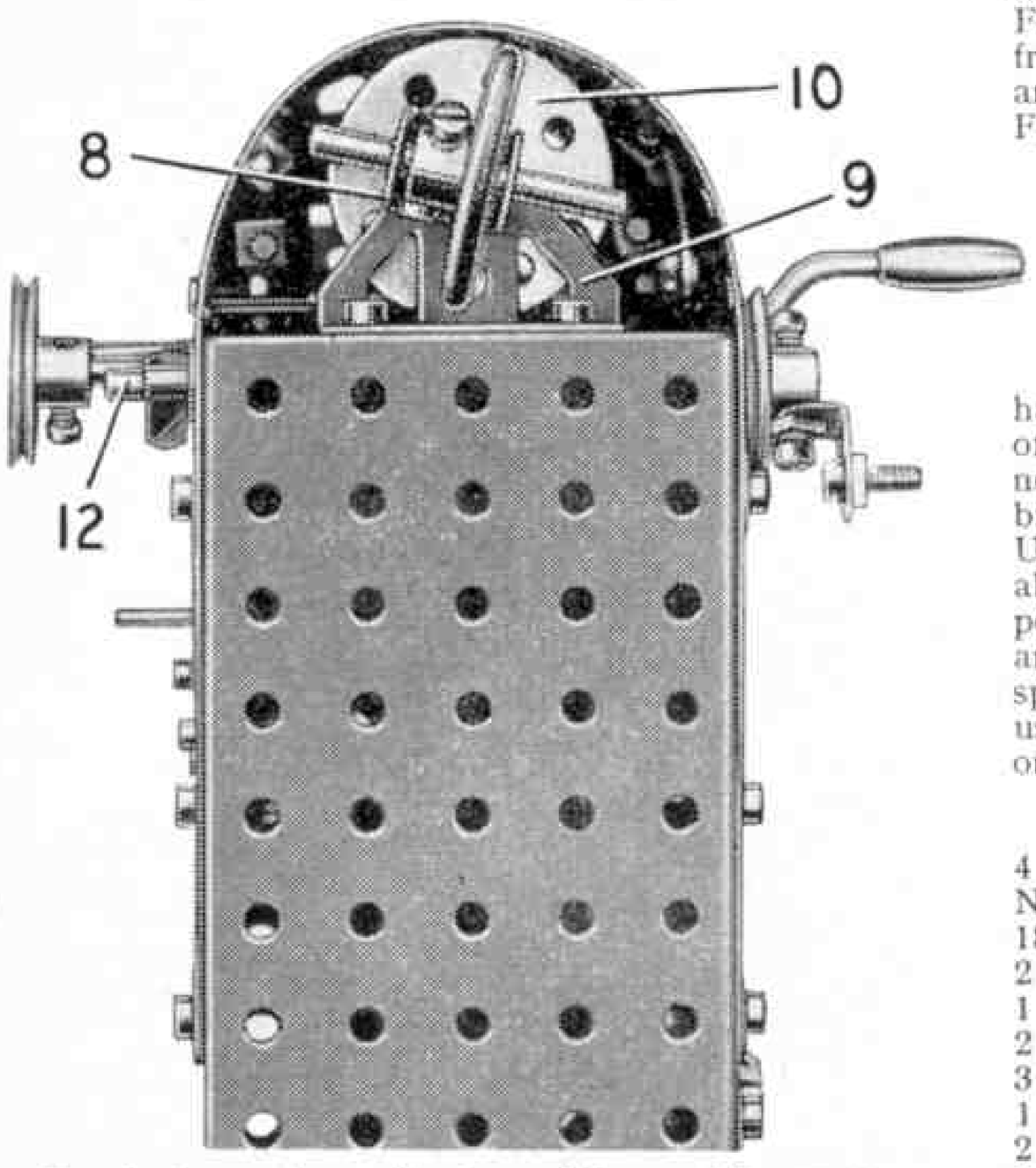
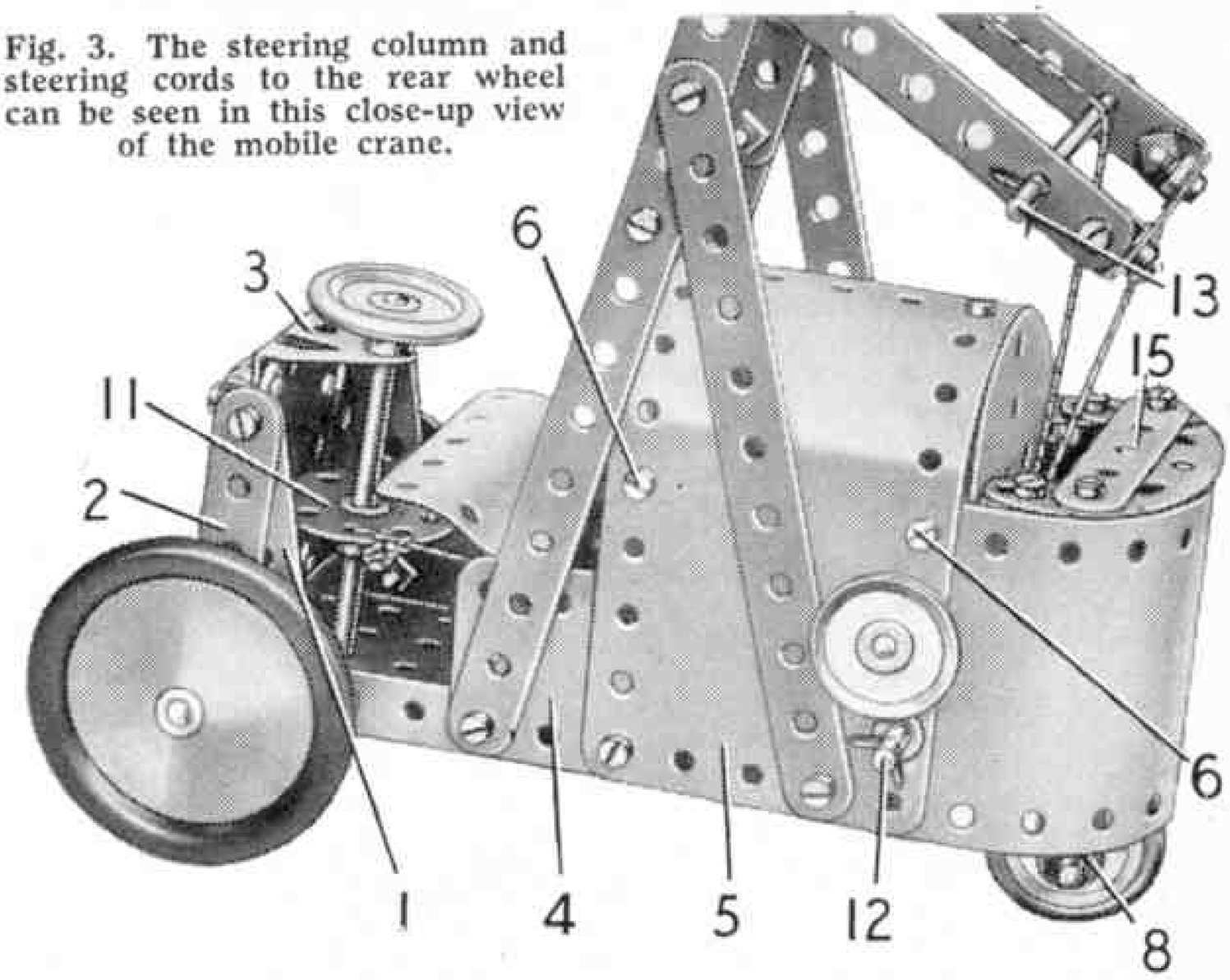


Fig. 4. An underneath view of the mobile crane.

Fig. 3. The steering column and steering cords to the rear wheel can be seen in this close-up view of the mobile crane.



of which an Angle Bracket is fixed by a nut and bolt. The bolt is passed through the Angle Bracket and is screwed into one of the threaded holes of the boss. The nut is then tightened to hold the Bracket in position. A ⅜" Bolt fixed by a nut in the Angle Bracket serves as a winding handle, and a length of Cord fastened to the Rod is tied to the rear of the jib. The Rod is held in place by a Spring Clip.

The winding shaft for raising and lowering the load is a Crank Handle. This is passed through the sides of the body, and a length of Cord is tied to a Cord Anchoring Spring placed on it. The Cord is fed over a 4" Rod 13 and then round a ½" loose Pulley that is free to turn on a ⅜" Bolt 14 held by two nuts in one of the 12½" Strips.

A Semi-Circular Plate is bolted to each of the Double Angle Strips held by bolts 6, and the driver's seat, a U-section Curved Plate, bent as shown in Fig. 2, is attached to the Semi-Circular Plate at the front. A 2½" Strip 15 is bolted to a Curved Strip and is fitted at each end with a Fishplate. The Fishplates are bolted to Angle Brackets held by the same bolts that fix the rear Semi-Circular Plate to its Double Angle Strip. This construction leaves a gap between the Strip 15 and the Semi-Circular Plate, through which the hoisting and luffing Cords are passed.

Well, that completes the model, and if you have followed the directions carefully you should now have a sturdy workable crane that will give you lots of fun. Real cranes of this type are very popular now-a-days and they are used in large numbers in big warehouses, dockyards and factories of all kinds. Usually they are designed to lift loads weighing up to about 5 tons, and one of the main reasons for their popularity is the ease with which they can be turned around and manœuvred into position in the cramped spaces in which they very often have to work. Another useful point is that they can be readily driven from one job to another.

Parts required to build Mobile Crane: 2 of No. 1; 4 of No. 2; 9 of No. 5; 2 of No. 10; 1 of No. 11; 7 of No. 12; 2 of No. 15b; 3 of No. 16; 1 of No. 17; 1 of No. 18a; 1 of No. 19g; 4 of No. 22; 1 of No. 23; 1 of No. 24; 2 of No. 24a; 6 of No. 35; 45 of No. 37; 6 of No. 37a; 1 of No. 40; 6 of No. 38; 2 of No. 38d; 1 of No. 44; 2 of No. 48a; 1 of No. 52; 1 of No. 57c; 1 of No. 90a; 3 of No. 111c; 2 of No. 126; 2 of No. 126a; 2 of No. 155; 1 of No. 176; 2 of No. 187; 2 of No. 188; 1 of No. 190; 2 of No. 191; 1 of No. 192; 1 of No. 199; 1 of No. 212; 2 of No. 214.

A New Clock Mechanism

A Fine Subject for Skilled Model-Builders

A CLOCK is one of the most satisfying subjects for Meccano model-builders. Nothing could be more fascinating than setting a clock constructed entirely from Meccano parts to work, and seeing how it ticks off the seconds and marks up the hours with literally "clockwork regularity."

This month we are describing a new and up-to-date clock mechanism that can be incorporated in the grandfather type of casing, or if desired, in the smaller type of case, usually known as the "granddaughter" type. The mechanism is weight driven, and once the escapement mechanism is "set" the clock will keep excellent time and will run for about eight hours on one winding.

The housing for the mechanism is made by bolting two 12½" Angle Girders at each side to a 5½" × 2½" Flanged Plate 1 and to a 5½" × 2½" Flat Plate 2. The sides are connected at the rear by a 4½" × 2½" Flat Plate 3, and by three 4½" Strips at each of the points indicated at 4, 5 and 6 (Fig. 3). A 5½" Angle Girder 7 is held inside each Flanged Plate by the same bolts that fix the 12½" Angle Girder in position, and Girders 7 are connected by two 4½" × 2½" Flat Plates 8. Two 4½" Strips 9, placed face to face, are bolted in place as shown in Fig. 3. A 2½" Triangular Plate is fixed to the Flat Plate 3 and the upper Flat Plate 8, and the Triangular Plates are extended upward by 1½" Strips 10.

A double winding barrel for the Cords supporting the weights is assembled from three Wheel Flanges and three Face Plates. Two of the Wheel Flanges are placed between two Face Plates to make the drum for one of the Cords, and the second drum consists of a single Face Plate and Wheel Flange. The parts forming the drums are clamped tightly together by four 1½" Bolts, and the drums are fixed by the set-screws in the Face Plates to a 4" Rod. A Ratchet Wheel 11 is fixed on the Rod, and a 3" Sprocket 12 is free to rotate between the Ratchet and the Strips 6. The Sprocket is fitted with a Pawl 13, freely mounted on a ¾" Bolt fixed by two nuts in the Sprocket. The Pawl is held against the teeth of the Ratchet by a 2½" Driving Band, which is passed through the hole in the Pawl and is looped over a ½" Bolt fixed by two nuts in the Sprocket. The bearings for the 4" Rod are reinforced by Double Arm Cranks bolted to Strips 6 and 9.

Fig. 2. The clock pendulum and weight "bob."

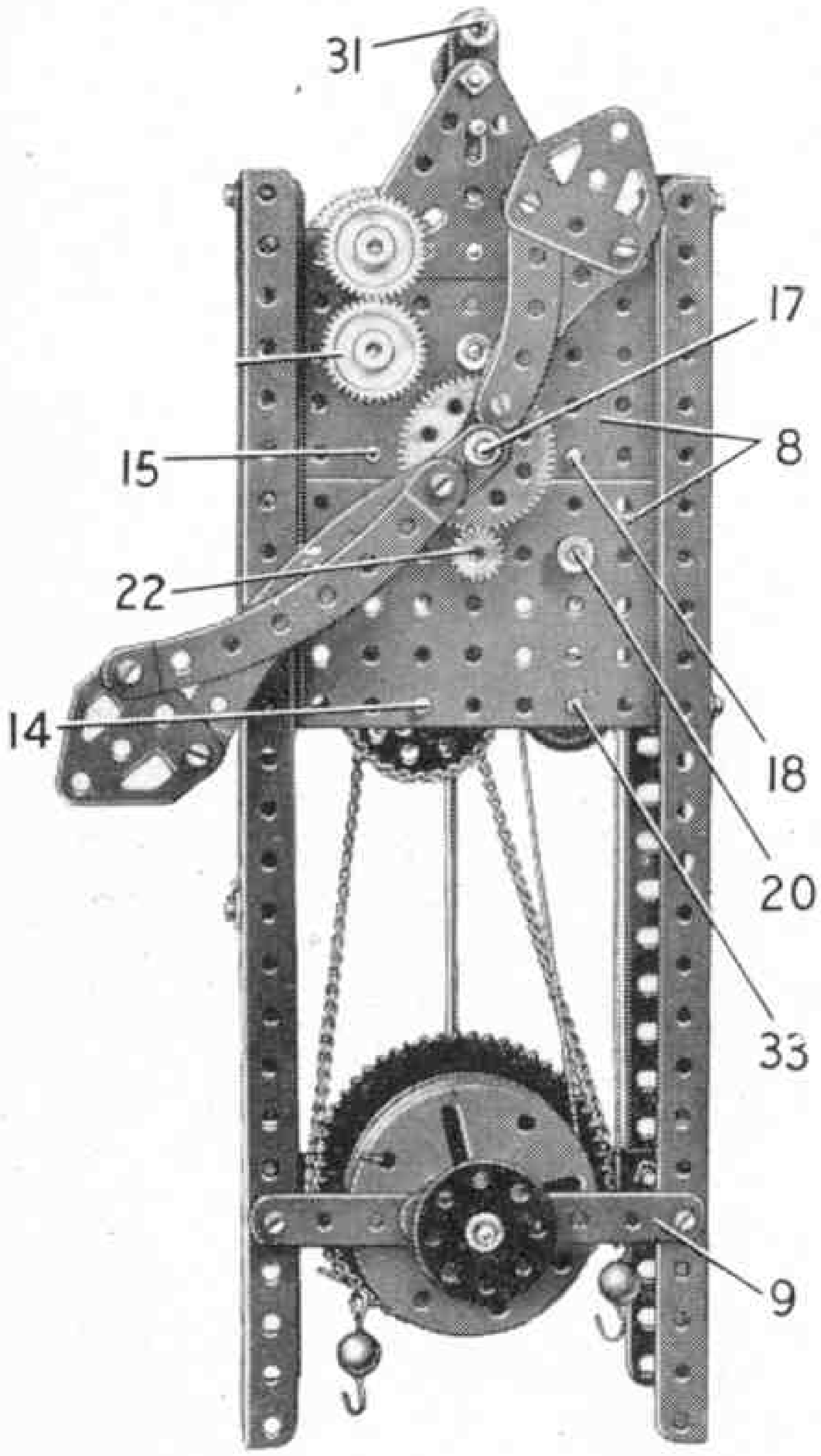


Fig. 1. A weight-driven timekeeping mechanism that can be used in either a wall or a grandfather type clock.

The Sprocket 12 is connected by Chain to a 1" Sprocket on a 2½" Rod 14, and a 1½" Sprocket on Rod 14 drives a 1" Sprocket on a 2½" Rod 15. Rod 15 is fitted with a 57-tooth Gear 16, and a ½" Pinion that drives a 57-tooth Gear on a 4" Rod 17. The Gear is loose on Rod 17, but it is pressed by a Collar against a 1" Pulley fitted with a Rubber Ring. This arrangement forms a friction drive that enables the clock hands to be adjusted.

A ¼" Pinion is fixed on Rod 17, behind the 1" Sprocket seen on Rod 15 in Fig. 3. This Pinion is in mesh with a 50-tooth Gear on a 2½" Rod 18 (Fig. 1) that carries also a 1" Gear, and the 1" Gear engages a similar Gear 19 on a 2½" Rod 20. Rod 20 is fitted with a ¾" Pinion that drives a 50-tooth Gear 21 on a 2½" Rod. A ½" Pinion 22 (Fig. 1) is fixed on the 2½" Rod outside the Flat Plates 8, and this engages a 57-tooth Gear that is loose on Rod 17. The 57-tooth Gear is spaced from the Flat Plate 8 by a Collar, and the hour hand is bolted to a Double Bracket fixed to the Gear. The hour hand consists of two 2½" Curved Strips bolted to the Double Bracket, and a Fishplate held by the same bolt is slipped over Rod 17. The minute hand is assembled as shown in Fig. 1, and it is bolted to a Crank fixed on the end of Rod 17.

The drive to the escapement wheel is taken from the 57-tooth Gear 16 to a ½" Pinion on a 2½" Rod 23. A 1" Gear is fixed on Rod 23 outside the Flat Plates 8, and it drives a similar Gear on a 2½" Rod 24. Rod 24 is fitted with a 50-tooth Gear that engages a ¾" Pinion on a 2½" Rod 25, and a 57-tooth Gear on Rod 25 drives a ½" Pinion on the escapement shaft 26. This shaft is a 3" Rod, and the escapement wheel, a 3" Sprocket, is fixed outside the Flat Plate 3. Collars are used to hold the gear train Rods in position.

The pallet is a 2½" × ½" Double Angle Strip 27 bent to the shape shown in Fig. 4. It is attached by a bolt to a Collar on a 3½" Rod 28, mounted in the Triangular Plates and the lower holes of Strips 10. Three Washers

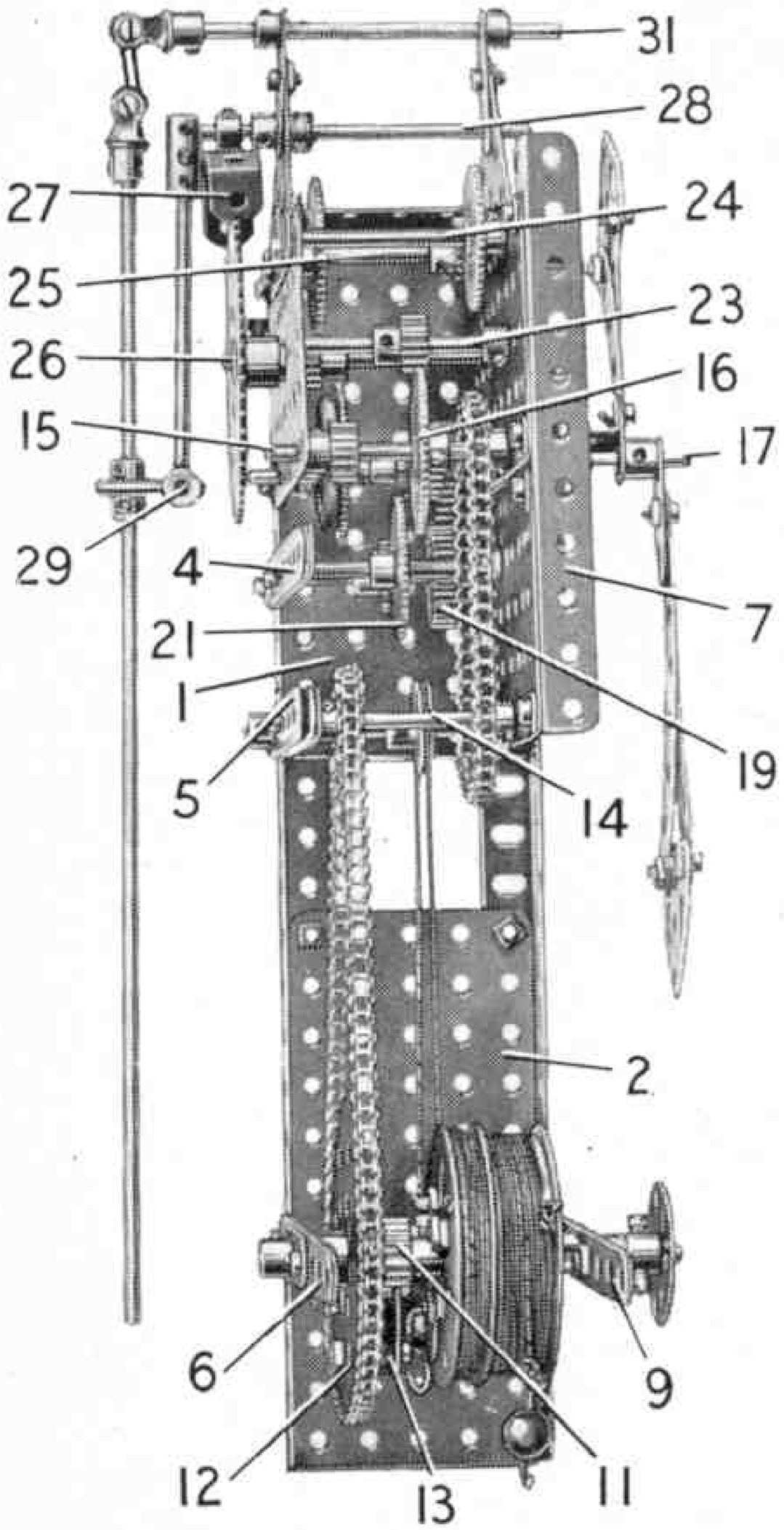


Fig. 3. Details of the gear trains are seen in this side view of the clock.

are placed on the bolt before it is passed through the Double Angle Strip. Rod 28 is fitted at its outer end with a Coupling, and a 4" Rod held in this Coupling carries a Coupling 29. Two 1" Rods are fixed in Coupling 29 to form the crutch for the pendulum.

The pendulum consists of an 11½" and an 8" Rod connected by a Coupling, and extended by a 6" Screwed Rod held in a Threaded Coupling. The bob weight is made by bolting a Boiler End to a Face Plate by means of two ¾" Bolts. The Screwed Rod is passed through opposite holes in the Boiler End, and nuts are used to keep the weight in position.

An End Bearing 30 is fixed to the upper end of the pendulum, and two short lengths of spring wire are clamped in it by a nut and bolt. The lengths of wire are fixed also in a second End Bearing that is held on a 3½" Rod 31. The Rod is passed through the top holes of Strips 10 and retained in place by Collars. Two Collars 32 are fixed to the pendulum, one on either side of the 1" Rods in Coupling 29.

Lengths of Cord are tied to the drums of the winding barrel, and are wound round the drums anti-clockwise. One length is passed over a 1" Pulley on a 2½" Rod 33, and the free ends of both lengths of Cord are fitted with small Loaded Hooks. The clock weights are Boilers complete with Ends filled with lead scrap, and they are attached to the Loaded Hooks.

The clock is wound by a Bush Wheel fixed on the end of the Rod that carries the winding drums, and a key can be made by bolting two 2½" Angle Girders to a second Bush Wheel. The Angle Girders are first joined together by ¾" Bolts passed through elongated holes, and the shanks of these Bolts are then slipped through holes in the Bush Wheel and are held in place by nuts. The boss of the Bush Wheel fits in the channel formed by the flanges of the Angle Girders, and the projecting ends of the ¾" Bolts can be inserted in holes in the Bush Wheel on the end of the winding shaft.

The clock requires careful adjustment, but once the correct setting has been obtained it will keep good time. The Double Angle Strip 27 should be bent so that when it is horizontal and the pendulum is vertical, the lugs of the Double Angle Strip just clear the teeth of the Sprocket. When the pendulum is in motion the escapement wheel is allowed to move the space of one tooth for each swing.

The positions of the Collars 32 must be adjusted so that they leave just sufficient play for the pendulum to swing freely. The clock is regulated by altering the position of the bob weight on the Screwed Rod. If the clock gains in time the position of the bob should be lowered, while if it loses time a higher position on the Screwed Rod is wanted.

Parts required to build the Clock Mechanism: 10 of No. 2a; 2 of No. 6a; 4 of No. 8; 2 of No. 9; 1 of No. 10; 1 of No. 11; 1 of No. 13; 1 of No. 13a; 3 of No. 15b; 2 of No. 16; 9 of No. 16a; 1 of No. 16b; 2 of No. 18b; 2 of No. 22; 1 of No. 24; 3 of No. 25; 4 of No. 26; 3 of No. 27; 4 of No. 27a; 4 of No. 31; 41 of No. 37; 21 of No. 37a; 40 of No. 38; 1 of No. 40; 1 of No. 48a; 2 of No. 52; 3 of No. 53a; 2 of No. 57c; 17 of No. 59; 1 of No. 62; 2 of No. 62b; 3 of No. 63; 1 of No. 63c; 2 of No. 70; 2 of No. 76; 1 of No. 79a; 2 of No. 89b; 2 of No. 90; 1 of No. 94; 1 of No. 95a; 2 of No. 95b; 2 of No. 96; 4 of No. 109; 3 of No. 111; 1 of No. 111a; 7 of No. 111c; 4 of No. 111d; 2 of No. 126a; 3 of No. 137; 1 of No. 147a; 1 of No. 148; 1 of No. 155; 2 of No. 162; 1 of No. 162a; 2 of No. 166; 1 of No. 186.

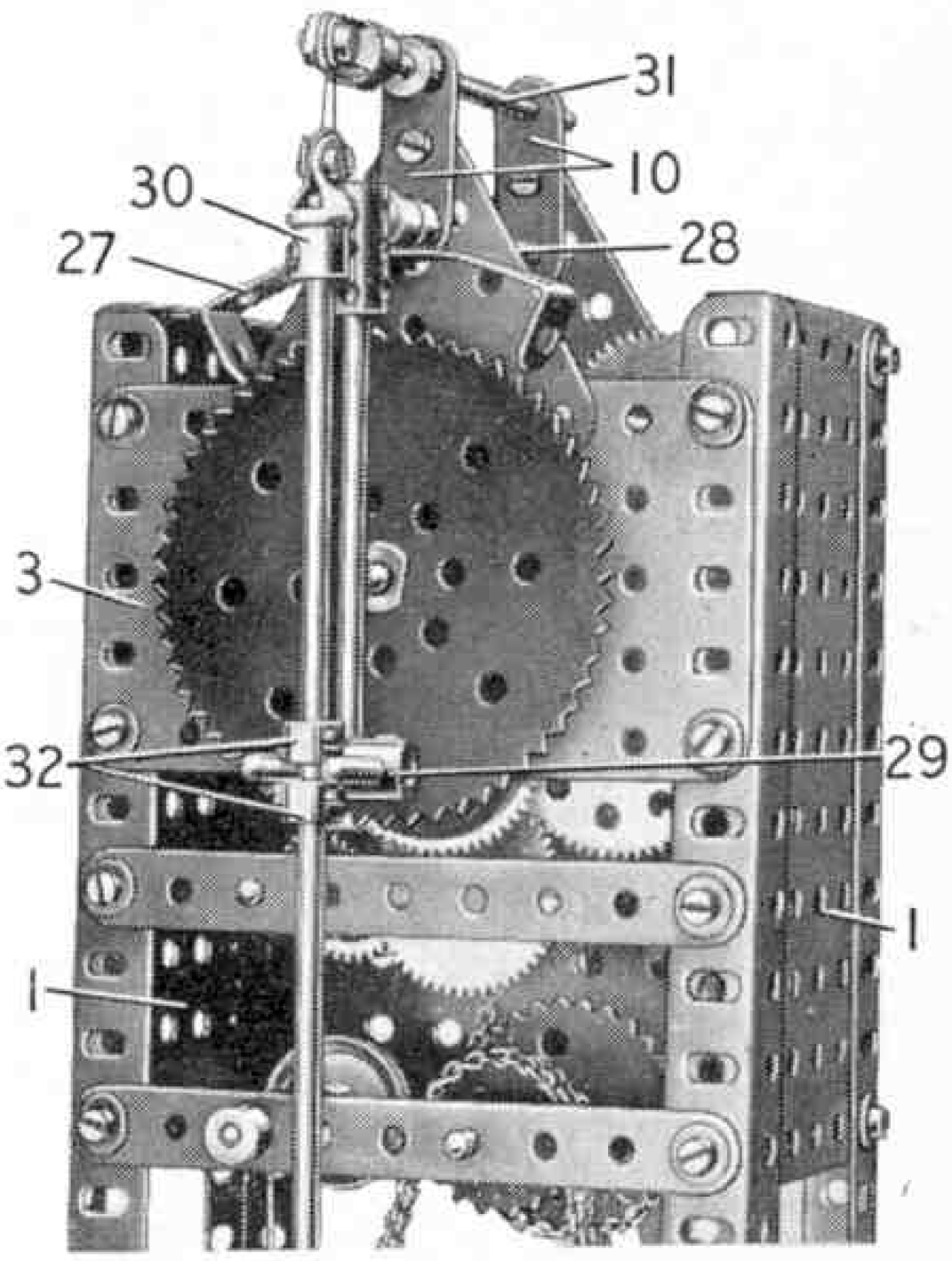
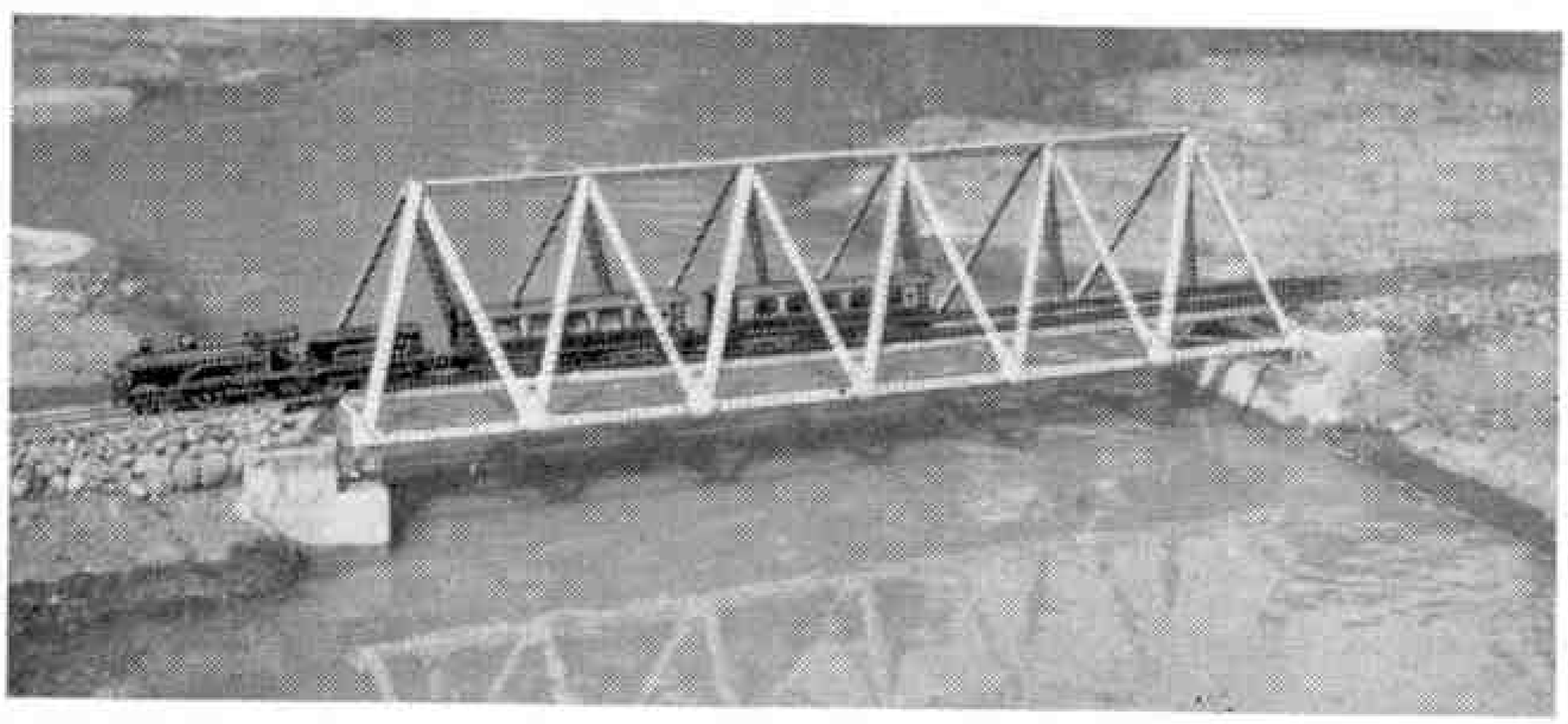


Fig. 4. The back of the clock showing details of the escapement device.

Novel Summer Competition

Meccano Models in Realistic Surroundings

WITH the coming of summer and the counter-attractions of cycling, cricket and other open-air sports and pastimes, indoor games and hobbies lose much of their interest for the majority of boys. It is only natural, therefore, that Meccano model-building passes a little into the background, to be resumed with renewed enthusiasm when the dark winter evenings come again. Many boys do not wish to suspend their Meccano activities altogether, however, provided that their model-building does not prevent them from taking advantage of the fine weather, and in order to meet the requirements of these enthusiasts we have decided to arrange a special competition in which all the necessary work can be done out in the open air.



This Meccano railway bridge arranged across a small stream is an example of the kind of entry suitable for the Competition announced on this page. The arrangement illustrated is the work of Carel Begeman, Semarang, Java.

In this Contest competitors are asked to submit photographs or drawings showing Meccano models of suitable types incorporated in natural and realistic outdoor surroundings. As an example of what is meant by this we illustrate on this page a simple Meccano bridge erected over a small stream of water arranged in a garden, and another scene showing a Meccano cargo ship entering a realistic dock. These subjects of course offer splendid scope for a contest of this type, but there are lots of other suitable models that will lend themselves quite readily for incorporation in a realistic setting. Of these we might mention excavating machines and cranes, locomotives and road vehicles.

Readers should note that it is not necessary to build a model specially for this Competition. There must be a model, of course, or perhaps two or three, but suitable models already under construction or completed can be used, so that it is not necessary to spend a lot of time indoors model-building.

Also a quite simple model will do; the main thing is to incorporate it in really "life-like" surroundings and then obtain the best picture possible.

The Contest is open to readers of all ages, and in order to give the younger competitors fair chances of success, each competitor's age will be taken into account in judging the merits of his work.

For this Contest it is preferable to send photographs, but drawings can be sent. It is not necessary that photographs should be taken by competitors themselves, however, so long as the model and its setting are their own work. Each photograph submitted should bear the sender's age, name and address on the back.

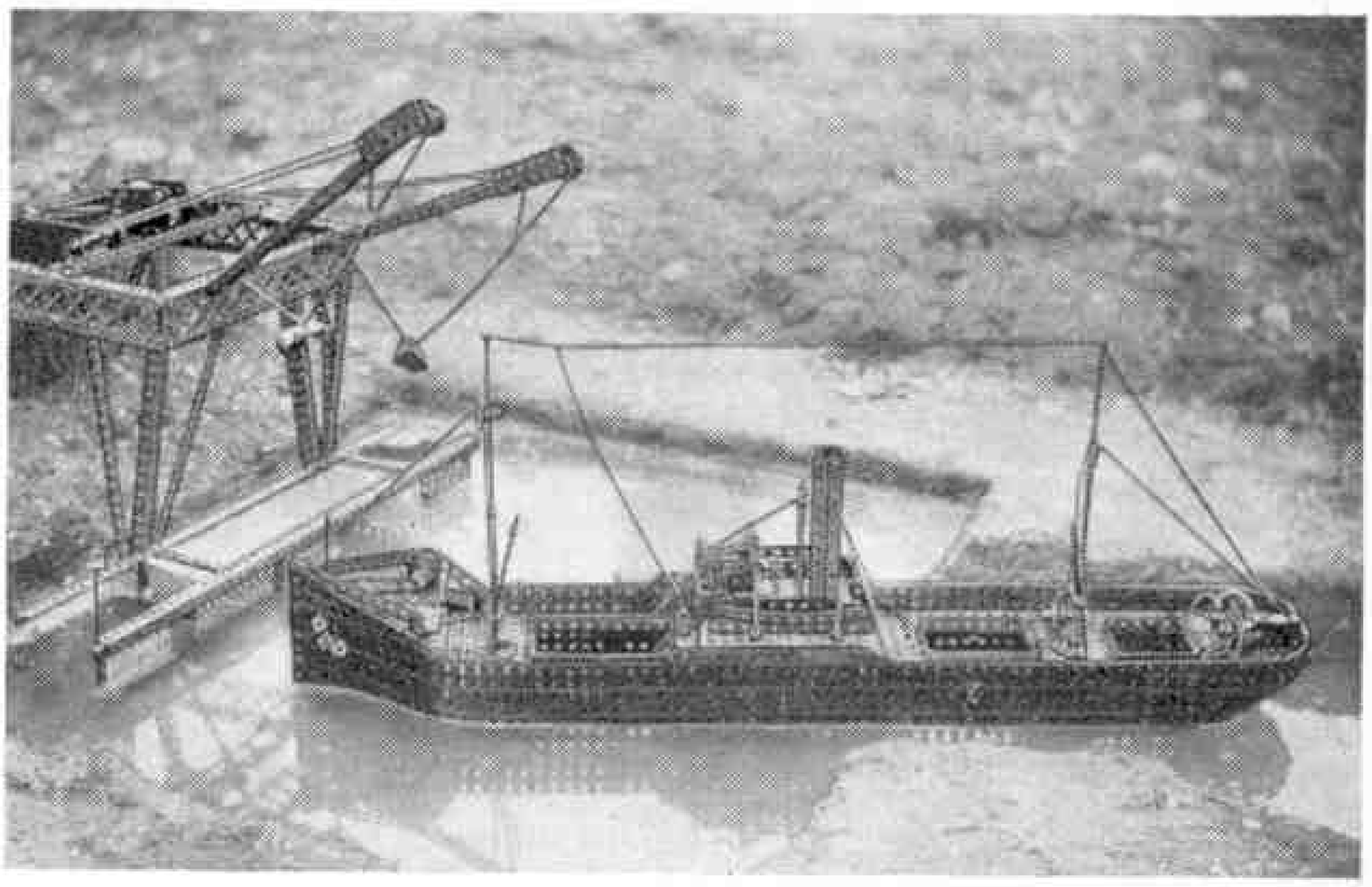
We realise of course that while it is summer here, some of our Overseas readers will not be finding it so pleasant out-of-doors just now, and so that they may be able to take part in the Competition we are prepared to accept from them entries showing suitable models incorporated in realistic *indoor* surroundings.

The following complete set of prizes will be awarded in the Competition: First, Cheque for £6/6/–. Second, Cheque for £4/4/–. Third, Cheque for £2/2/–. There will be also Ten Prizes, each consisting of a Cheque for £1/1/–.

In order to give everyone an opportunity to take part in this interesting Competition, it will remain open for entries until 31st August next. Entries should be addressed *Meccano "Realism" Model-Building Competition, Meccano Ltd., Binns Road, Liverpool 13.*

Competitors may send as many entries as they wish, but no competitor will be awarded more than one prize.

Prize-winning entries become the property of Meccano Ltd., and we hope to reproduce some of the best photographs in the Magazine in due course. Competitors who wish to have unsuccessful entries returned must remember to include stamped addressed envelopes of suitable size with their entries for this purpose.



This realistic scene of a ship entering dock was arranged and photographed by Robert C. Sculpher, Tilbury.

Club and Branch News

WITH THE SECRETARY

VISITING PLACES OF INTEREST

Some of the most interesting letters I receive from Club Leaders and Branch Chairmen come at the beginning of each Session, and are full of enthusiasm for plans that have been made for enjoyable and profitable meetings during the three months ahead. I have been very pleased to note from these letters of late that more attention is being given to arranging visits to local places of engineering or railway interest. The value of such visits cannot be underestimated, as they keep the members together and help to build up that sense of unity so important in Club and Branch life. They also give members an insight into the business and industrial affairs of their own locality, which is the kind of knowledge that all should possess.

Lastly they provide ideas for new models to build, and for scenes and layouts incorporating groups of models. This indeed is one of the greatest advantages of such visits, and the possibility of putting information gained on such visits to good use in the Club or Branch room should always be kept in mind.

BRANCH RECENTLY INCORPORATED

No. 544—East Grinstead Branch—Mr. L. Kimber, 46 Hollands Way, East Grinstead.

CLUB NOTES

Hornsea M.C.—Meetings have been well attended. In addition to Meccano model-building there have been interesting Talks given on the history of travel, the construction of ships, Hornsea Church and Lincolnshire. A Quiz between the members from Bridlington School and the rest was good fun. The usual Games Evenings have been held. Club roll: 12. *Secretary:* D. M. Stevenson, 29 Southgate Gardens, Hornsea, E. Yorks.

Strensall (York) M.C.—This recently affiliated Club is making good progress. The programme includes model-building Competitions on a monthly points basis, Contractors' Nights, Talks and Debates. An interesting schedule of summer outings is being carried out. Club roll: 15. *Secretary:* M. Kendall, 4 Mafeking Villas, Strensall, York.

Mile End (Portsmouth) M.C.—A miniature cup has been presented to Mr. P. Leggatt, the Leader, for his splendid services to the Club. The Meccano trolley bus has been finished and will be exhibited in the window of a local store during Coronation Week. A Model Aeroplane Section has been started. Club roll: 48. *Secretary:* Mr. A. J. Nicholson, 213 Sultan Road, Buckland, Portsmouth.

Newtown (Eire) M.C.—This Club has been revived and has been busy preparing for a model-building Exhibition. Plans are in hand for visits to several local places of interest. Club roll: 11. *Secretary:* A. Pim, Anngrove, Mountmellick, Leix, Eire.

Collegians (Cork) M.C.—Recent activities have included Lectures and Film Shows, and preparations for a Meccano display at the Collegians Social Club Festival Exhibition. Club roll: 20. *Secretary:* N. Looney, 66 Grand Parade, Cork, Eire.

Copdock and Washbrook M.C.—Fortnightly model-building Competitions, organised on a points basis, are very popular. Two Beetle Drives have increased Club funds by £2/10/–. Club roll: 12. *Secretary:* K. E. Whitten, The Street, Copdock, Nr. Ipswich.

St. Georges (Gateshead) M.C.—A Competition for the largest number of models built during one meeting was won by two members who each completed 15 models. Club roll: 14. *Secretary:* N. Baker, 74 Dryden Road, Low Fell, Gateshead 9.

SOUTH AFRICA

Cape Peninsula M.C.—Model-building continues to be the main activity, and at recent meetings members have been busy preparing for an Exhibition. Club roll: 15. *Secretary:* Mr. F. E. Goy, "Dimson Villa," Summerley Road, Kenilworth, Cape Town, South Africa.

BRANCH NEWS

Hindhead and District—Four films, all of railway interest, were shown at a recent Film Evening to which relatives and friends of members were invited. A very interesting Talk by Mr. Bolton, of the Southern Electricity Board, was illustrated by a film *The Generation of Electricity*, after which he answered questions put to him by members. *Secretary:* B. J. Hinde, Hindhead Brae, Hindhead, Surrey.

Mile End (Portsmouth)—Meetings have been devoted mainly to experimental layouts preparatory to an Exhibition. These have included tests with elevated coal sidings and hump marshalling, and with various layouts for clockwork operation. *Secretary:* J. Jeffery, 52a Elm Grove, Southsea, Portsmouth, Hants.

Intensely interested visitors to the ninth Annual Meccano and Model Railway Exhibition of the Barkers' Butts Boys School M.C. This excellent Club continues to thrive under the enthusiastic Leadership of Mr. F. Batten, who has been associated with it since its formation. Photograph by courtesy of the Coventry Evening Telegraph.

HORNBY RAILWAY COMPANY

By the Secretary

More Good Things in Hornby-Dublo

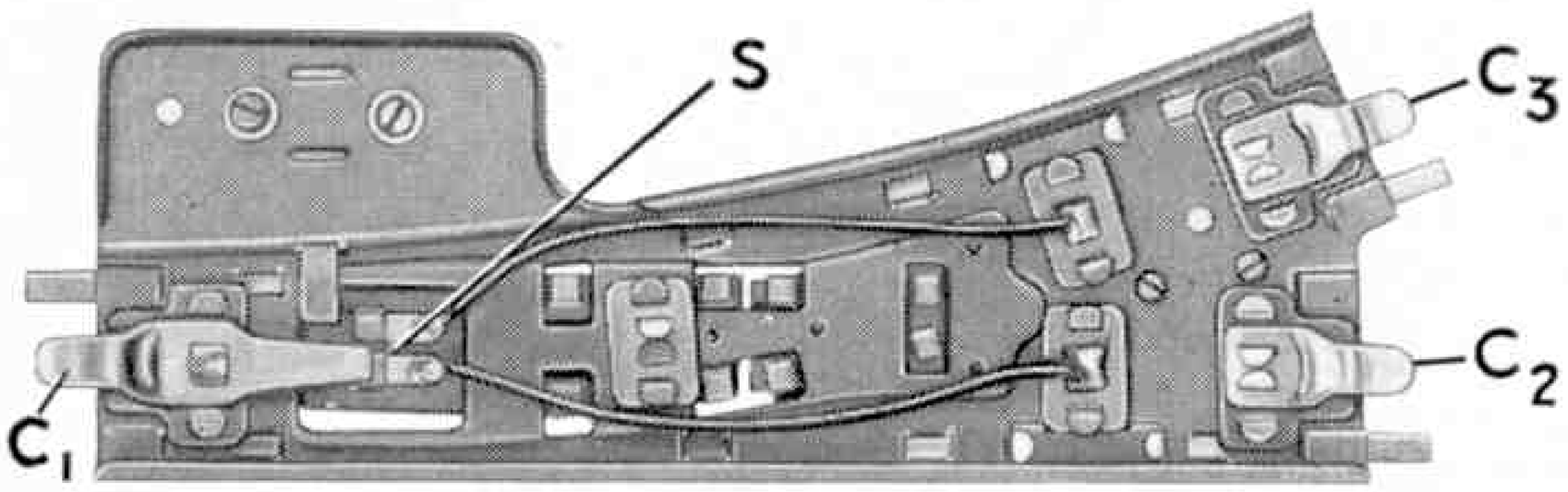
THIS month I want to tell you something about further recent developments in the Hornby-Dublo System, which will add considerably to the fun and pleasure of train running. I am sure you will find the details of special interest.

All of you who are Hornby-Dublo owners are familiar with Isolating Rails and Switches, and with the Insulating Tabs that form standard equipment for dividing layouts into separate electrical sections. As most readers know, only one Hornby-Dublo train can be run at one time on a given main section of track, the Hornby-Dublo Transformer and Controller being designed precisely to meet this requirement. This arrangement makes for safety in working because, in effect, we have on a layout the *"one section, one train"* idea that governs block section working on real railways.

For realistic operation we need several engines and trains on the same railway, but for this it is essential that each main track, such as the up and down roads of a double track main line, or a complete goods yard, should form a separate electrical section, with its own Transformer and Controller. To provide independent control the centre rail circuit between any Points connecting main sections has to include an insulating gap. This is where the Insulating Tab comes in.

Even with a single Transformer and Controller it is possible to have more than one engine on the line. But only one of them can run at one time, the others being held in loop lines or sidings that form separate sections that can be made alive or dead as required. Hence the familiar Isolating Rails and Switches, and the Insulating Tabs.

An introduction in the Hornby-Dublo system helps greatly in all this. It is the new form of Points, known as Isolating Switch Points, which replace the former hand-operated Points but not the Electrically-Operated ones. They make Hornby-Dublo Railway working simple, for when the points lever is moved to set the road for the train it also directs the current to the route on which the train is to go.



Underneath view of the Isolating Switch Points. Current is fed to the centre rail connecting clip C1 and is directed by the selector switch S to either route C2 or C3 according to the position of the Points blades.

Exactly how this is done is made clear in the upper illustration on this page. This shows the underneath of a set of Left-Hand Switch Points. The various limbs of the centre rail circuit are denoted by the letters C1, C2 and C3. The letter S distinguishes the selector that is attached underneath the switch rail unit and moves with it.

In the illustration the switch rails are set for the straight and current is fed from the C1 part of the circuit, by means of one selector contact, to the C2 part of the circuit. The C3 section is therefore left dead. Now what happens if the switch rails are set to lead to the curved branch? The selector contacts move with them and electrical connection is then established from the C1 side of things to C3; now the C2 element is switched out.

This is a simple and effective arrangement. It is just as easy to apply the Points

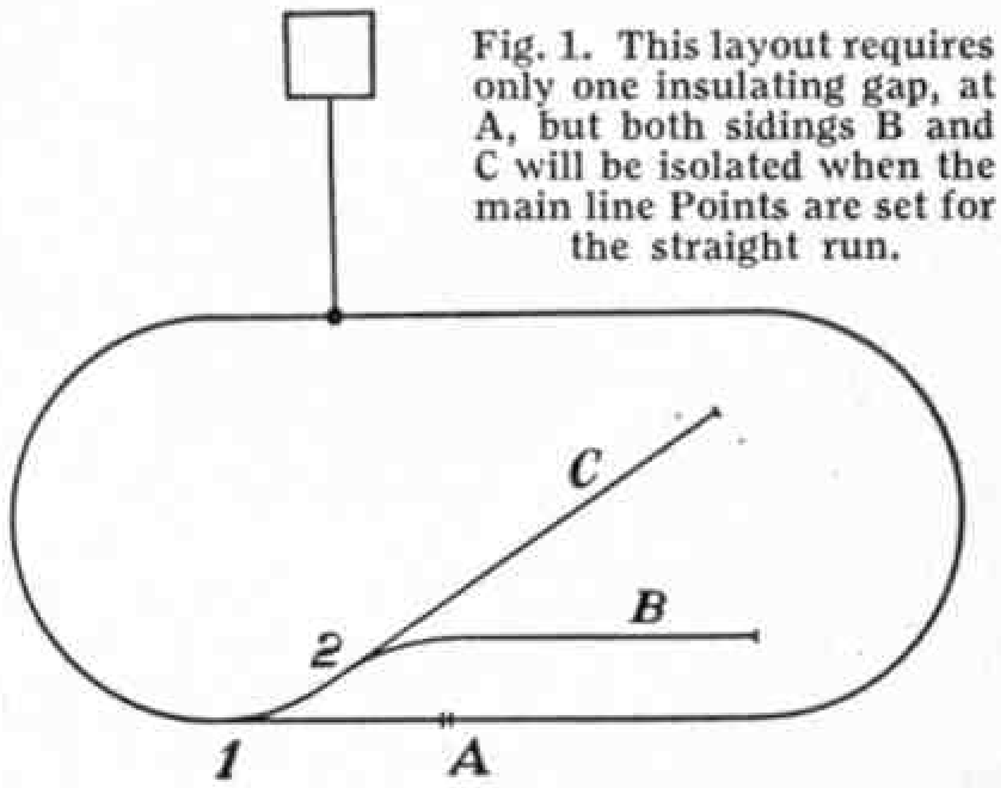


Fig. 1. This layout requires only one insulating gap, at A, but both sidings B and C will be isolated when the main line Points are set for the straight run.

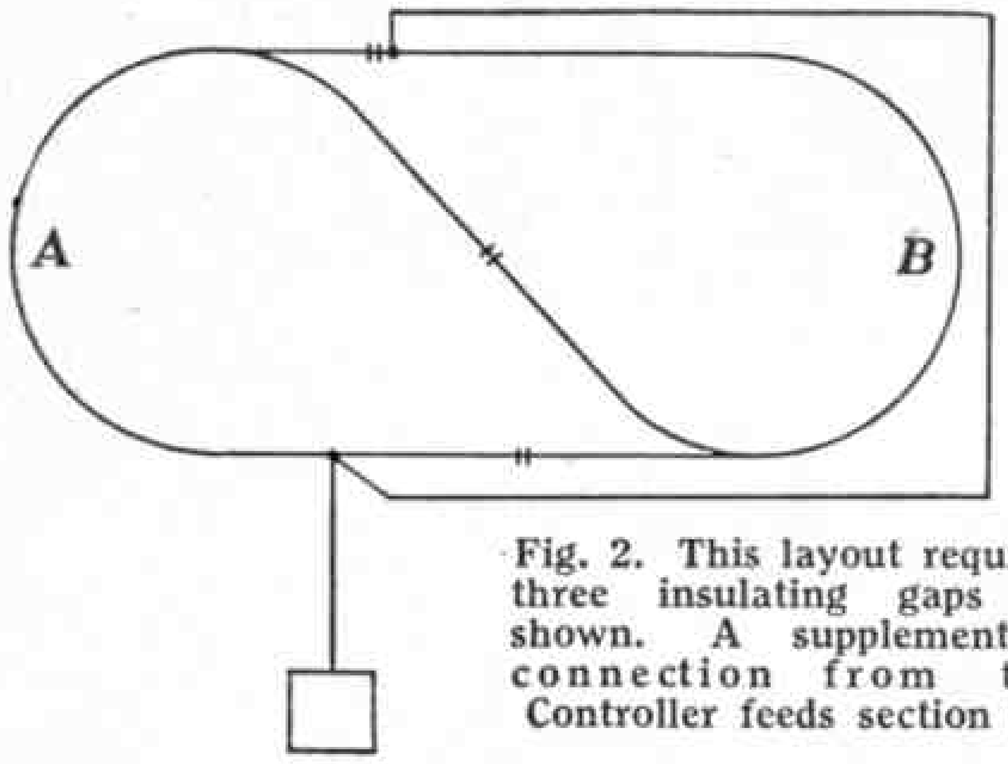


Fig. 2. This layout requires three insulating gaps as shown. A supplementary connection from the Controller feeds section B.

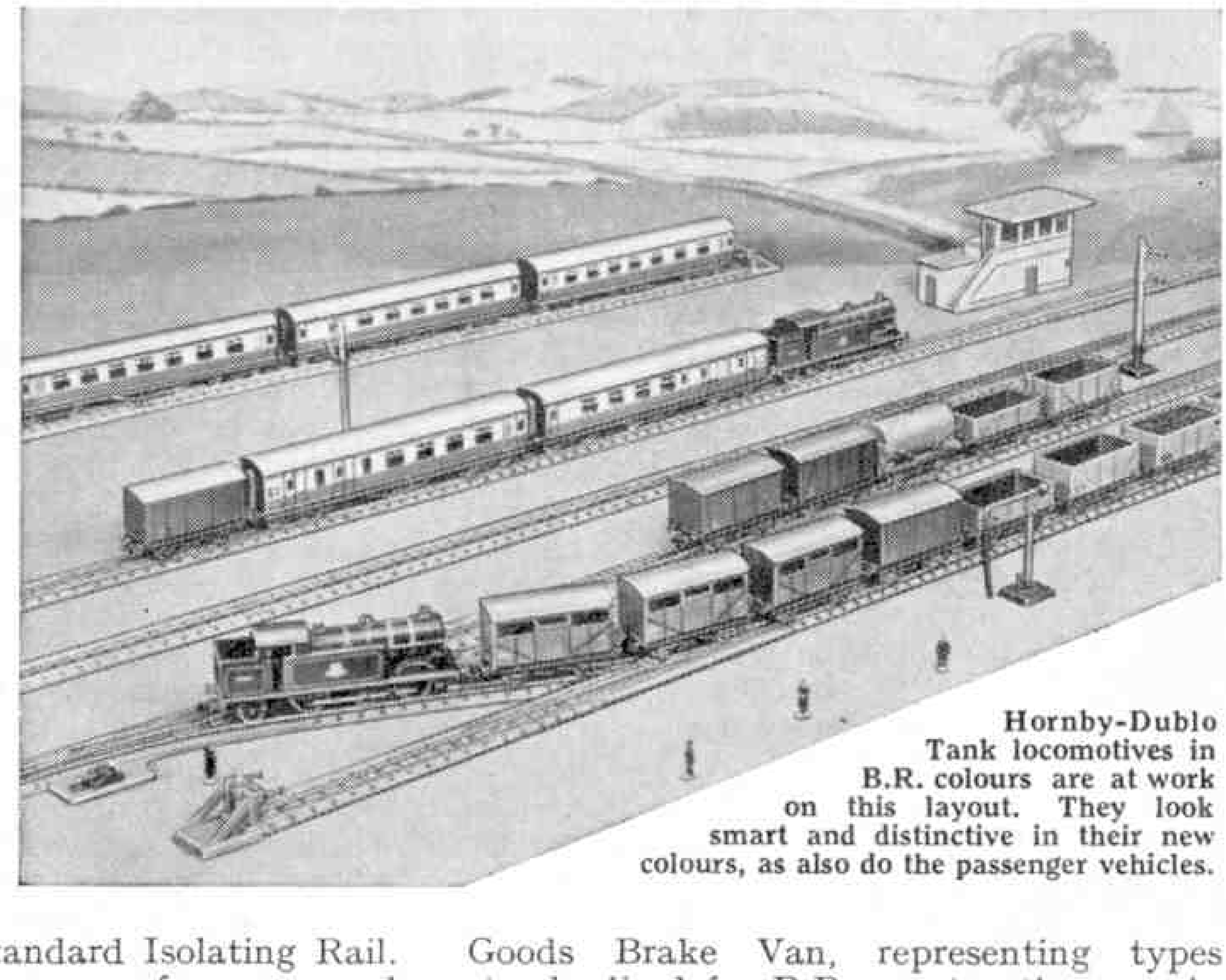
properly to a layout so as to take the fullest advantage of their special feature. In the first place the current must always be fed to the railway on the facing side of the Points. This is easily done with the simple layout shown in Fig. 1, the diagram on the opposite page, and it is no more difficult with a layout such as that shown in Fig. 2, on this page, where a train running in a clockwise direction meets two sets of facing Points in succession. In this the main power supply is taken as usual to section A on the facing side of the upper set of Points, and all that is necessary as well is to provide a feed to section B, so that this part of the layout does not remain permanently isolated. One way of doing this is to use a second Terminal Rail, but a simpler way, which also provides the gap shown in the upper part of the track, is to use a standard Isolating Rail. This looks after the gap, of course, and if the supplementary feed wire taken from the Terminal Rail is led to the terminal on the B side of the Isolating Rail, it will supply current to the B section as well.

Further news concerns the popular Hornby-Dublo Goods Train Set in its new presentation. Like the Passenger Train Sets already dealt with, the EDG17 Tank Goods Train Set in B.R. livery does not include a Controller; but in addition to the Open Wagon, Van and Goods Brake Van always included there is now one of the attractive Hornby-Dublo Oil Tank Wagons as well. So we have a longer and more varied train with which to begin operations.

The familiar Hornby-Dublo 0–6–2 Tank locomotive looks very smart in its glossy black livery with grey and red lining in B.R. style on the tank and bunker sides, red lined boiler bands and the well known "Lion and Wheel" emblem on the tanks. The engine number appears on the sides of the coal bunker as well as on the smoke-box door.

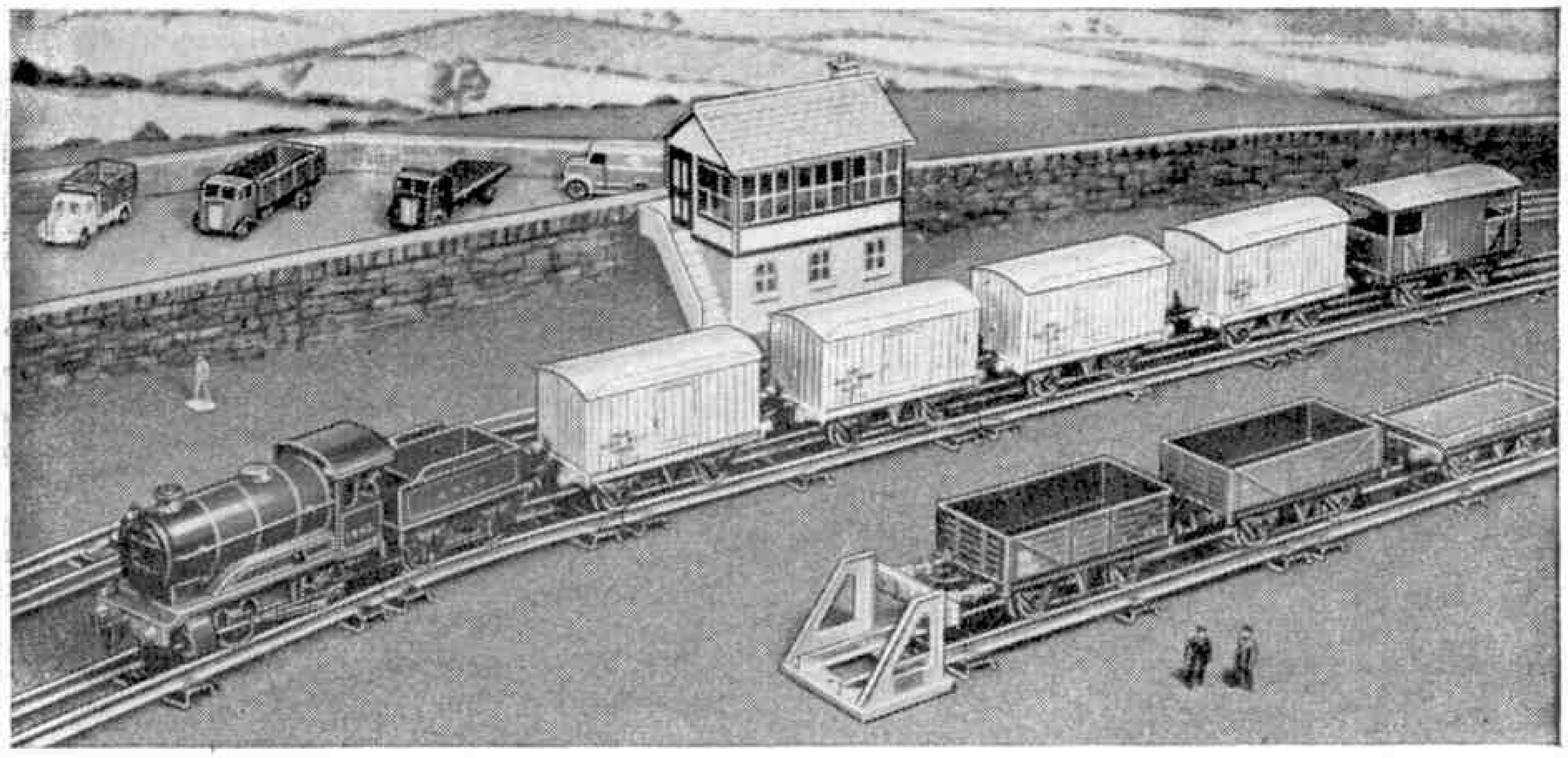
A detail that adds considerably to the appearance of the engine is the fitting of spoked trailing wheels.

Except for the Tank Wagon, which represents a privately-owned vehicle, the rolling stock composing the train is now finished in B.R. style. The Open Wagon is finished in grey, and the Van and the Goods Brake Van, representing types standardised for B.R. construction, are in bauxite red. The Brake Van is particularly interesting, having a short body mounted on a long wheel-base underframe, a form of construction standard for goods brake vans now under construction.



Hornby-Dublo Tank locomotives in B.R. colours are at work on this layout. They look smart and distinctive in their new colours, as also do the passenger vehicles.

Other items are being added to the range, among them the Bogie Bolster Wagon illustrated elsewhere in this issue. Details of these will appear in the *M.M.*



Running Like Clockwork

WHAT do we mean when we say anything "runs like clockwork?" The answer of course is that it runs steadily and surely, and is something on which we can depend for regularity.

A Hornby locomotive runs "like clockwork" in this very fine sense of the phrase, and is capable of doing so even in unfavourable conditions. But it is only fair to see that it is well kept and run on rails that are correctly placed, so that the most is made of its high qualities.

In the first place, the track must be level, with the rails correctly aligned and joints properly made. It is remarkable how many miniature railway owners attempt to run trains over a roughly-laid track in which there are perhaps several places where the rails have been forced into position. This sort of treatment is not good for the rails themselves, and will cause a lot of trouble when the trains are running. There is no excuse for the track being out of gauge, for the handle of a Hornby locomotive winding key is designed to form a rail gauge and with it the Hornby railway owner can quickly check his track throughout. At any tight places that may be discovered the running rails should be eased outward slightly.

The engine ought to be kept in good order, but it is surprising how many are not. Their owners oil them once or perhaps twice when they are new, and this oiling is then expected to do for a very long time. Dust accumulates on the oily working parts, carpet "whiskers" and similar nuisances get entwined around the axles and elsewhere, and by degrees the running of the engine deteriorates. So cleaning and light lubrication with good quality oil should be carried out *regularly*.

This oiling is important, but it must not be excessive, for surplus oil not only attracts dirt and makes the engine untidy, but also finds its way to the wheel treads and thence to the track, with the result that slipping trouble begins. This will prevent satisfactory starting and cause the engine to use up much of its "wind" without moving, so that its length of run will be restricted.

In the illustration above a Hornby Clockwork engine gets along with a train of Refrigerator Vans. The engine is of the 501 type and displays the correct headlamp indication for the type of train it is hauling.

It is equally necessary to keep the vehicles that make up the train in good order. Clean, free-running wheels are essential and a point missed by many operators is that the couplings, which have to move sideways slightly when the train is running round curves, must be nicely free. Not loose, but with just a nice smooth movement due to the slightest amount of oil having been applied to each coupling pivot.

Another point is that the couplings should be kept in proper alignment and any that may have been bent through mishaps or rough handling should be corrected. This will avoid annoying difficulties when a train running programme is being carried out. Don't forget—coupling and uncoupling should always be gentle.

Hornby-Dublo in the Far West

The new "Pacific Great Western"

By A. J. Tomlin

READERS may remember the *Pacific Great Western* railway of mine that appeared in the *M.M.* last July. Soon after that description was printed the railway had to be moved and in course of the upheaval certain changes were made. Space restrictions were severe on the new site and 6 ft. by 4 ft. represented the maximum limits of space that I could work to.

So the system was revised slightly, and essentially it remains strictly a utilitarian set-up. After all, a terminal freight yard such as is included in the centre of the system leaves little opportunity for scenery, but there are one or two lineside pieces.

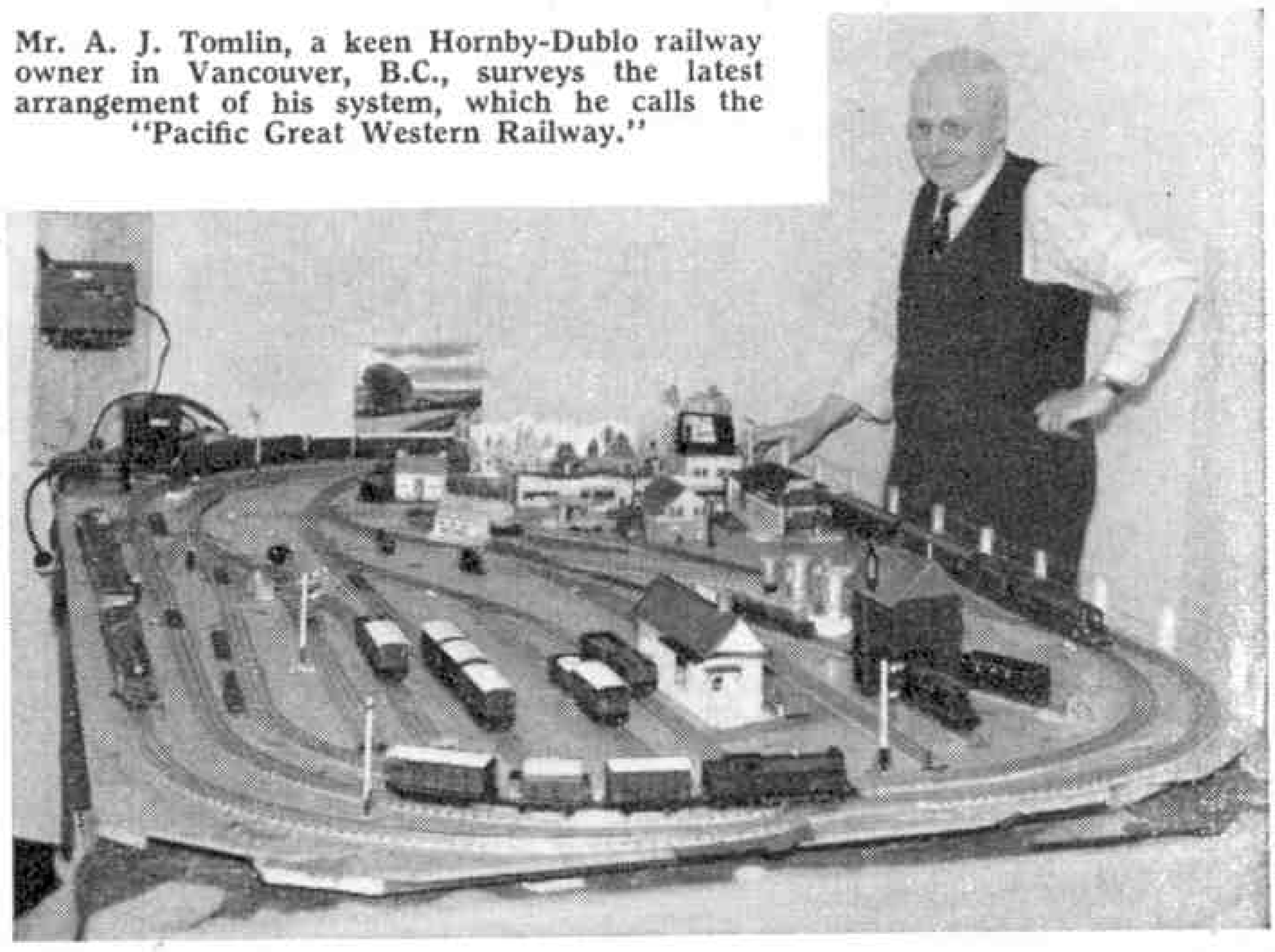
The main running track is still continuous and matters are so arranged that when passenger trains come to the end of their run the engines are uncoupled and take a trip to the coaling station. The yard engine "hooks on" to the passenger cars and hauls them round to the passenger sidings for cleaning. For making up a train we just reverse the procedure!

Goods trains enter at the left of the picture and the engine unhooks and travels on to just beyond the little white house at the top of the picture and then backs round to the engine tracks to the right of the freight shed. Then the yard engine takes the goods train and "breaks" it into the various tracks as required. On the whole, a really practical example of "real" railroading.

A boy might think "*I can never have a railway like that,*" but it's easy! Just keep in mind that there never was a model railroad that didn't start out with but one train and a few tracks! So don't get discouraged if it seems impossible for you to get a layout like the one pictured here.

To start off, if you have one train and the usual oval track, get a few more rails and a pair of points—and make a loop line. Even with one engine you can "break" a train and shunt part of it into this loop, run round the main track a few times and then back in again and pick up the shunted vehicles. Then you add either another circuit or a goods yard, preferably the latter because then you can "work" at making up different trains and then distributing them. Almost all of my running time is spent thus.

Remember you are planning ahead, so don't expect to get it together in a few months. Let me say here that I'm sorry my own little layout is finished, for the time being. A lot of the fun in model railroading is in alterations and maintenance work; so much so that I have taken this layout up and relaid it three times, just to improve it, and to amuse myself. No matter for how many years one is a model railroader, one is always striving to improve and find something new for the layout. That is why model railroading is always fun.



Mr. A. J. Tomlin, a keen Hornby-Dublo railway owner in Vancouver, B.C., surveys the latest arrangement of his system, which he calls the "Pacific Great Western Railway."

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For other Stamp Advertisements see also pages 326 and xvi.

Stamp Collectors' Corner

By F. E. Metcalfe

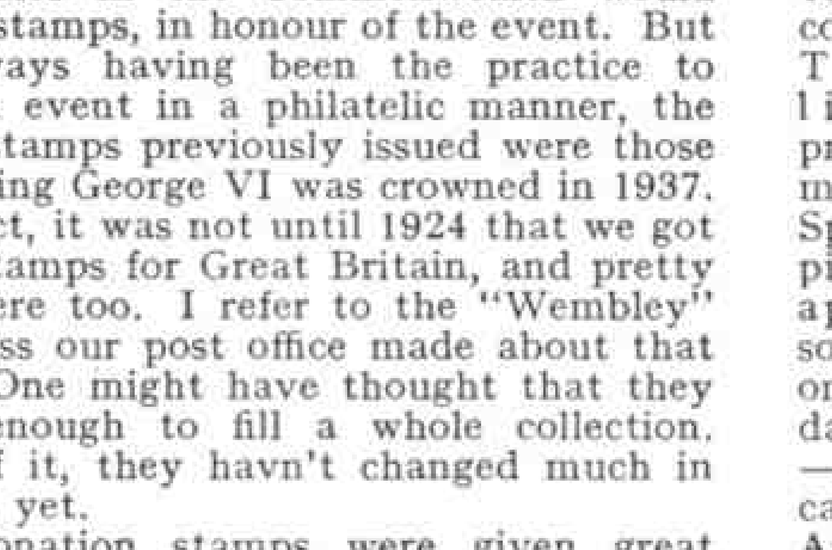
CORONATION STAMPS

WITH everybody so excited about the Coronation, anything to do with the affair at all is of interest. But stamps are not just something of minor significance, and as there has been so much talk about them collectors are feeling very important indeed, for they alone know all about the issues due for release all over the Commonwealth. Pity some of the newspapers hadn't called in a collector to advise them. They would thus have avoided many of the rather silly stories that have been printed.

When the Coronation of Queen Elizabeth was announced it was taken for granted that most countries in the Commonwealth would issue a stamp, or stamps, in honour of the event. But far from its always having been the practice to celebrate such an event in a philatelic manner, the only Coronation stamps previously issued were those produced when King George VI was crowned in 1937. As a matter of fact, it was not until 1924 that we got the first special stamps for Great Britain, and pretty moderate they were too. I refer to the "Wembley" issue. What a fuss our post office made about that pair of stamps! One might have thought that they were preparing enough to fill a whole collection. Come to think of it, they havn't changed much in that respect even yet.

The 1937 Coronation stamps were given great publicity, and in view of the high prices that KG V Jubilee stamps were bringing, not only did collectors buy them in quantities, but many outsiders, as a speculation, went in for sheets, thinking in their ignorance that they were bound to make a big profit. Actually most of them made quite a big loss, and though the public memory is short, it is to be hoped that we will not have those outsiders again dabbling in something they know nothing about. But more on that later.

The colonies had three stamps each, all of the same design, but beyond a shade variety for Malta, there were no other varieties to tickle collector's palates, and it must be admitted that they were rather a dull lot. New Zealand had three stamps of almost the same design as that used for the previous Jubilee issue, and as these latter were bringing several shillings a set, those tyros I have mentioned bought up a lot of the N.Z. Coronations. They are still only worth very little more than they cost.



Strangely enough Australia, which is bringing out such a relatively expensive set this time, did not release any Coronation stamps at all, though two ordinary values, one bearing a portrait of King George VI and the other of his Queen, were released at the time. These have been more or less accepted as the right thing. Collectors have very wide imaginations when it pleases them.

Newfoundland, as part of Canada, does not issue stamps now, but over the 1937 Coronation it really went to town. As in the colonies, three stamps of the same design were suggested, but that did not satisfy this erstwhile Dominion, and they issued not only the colonial trio but a long set of eleven values. This has provided more philatelic material in the way of perforation varieties, retouches, etc., than all the other Coronation sets put together. There are three different perforations, and a number of stamps without watermark. These latter should be collected in pairs when mint, one with and one without, but be sure that one of the stamps has not got the slightest trace of any watermark, or otherwise it will not be accepted as the pukka variety.

Another very interesting stamp in the issue is the 1c. with what is called the "fish-hook" variety. This consists of a small T shaped guide line, which protrudes from the mouth of the fish. Specimens are to be picked up off approval sheets sometimes—I saw one only the other day marked at 4d. — and are catalogued at 7/6. Anyhow, ignoring the Newfoundland perforation varieties etc., a complete set of the 1937 Coronations can be still obtained for about 70/–, but now that we have so many more to go with them, to keep them company as it were, we may see a rise in price.

But what of the new crop that will descend upon us a few days after these lines are in print? These I think will be on the whole finer than those we have had before. Sixty-three colonies, etc., are having a single stamp, which just shows a portrait of the Queen, but the design is chaste and reminds us of that of those fine old colonial stamps of long ago. Then we have a single stamp for Southern Rhodesia, and there has been some comment that one of such a high face value as 2/6 has been selected.

Now we come to the sets for the Dominions. Australia will have three stamps, 3½d., 7½d. and 2/–, and New Zealand five stamps, 2d., 3d., 4d., 8d., and 1/6. In connection with the N.Z. set, the Dependencies of New Zealand are also to have Coronation stamps. Previously they had those of the parent country, but overprinted. Now Cook Is., Niue and Western Samoa are to have two each and Tokelau one. The designs will be similar to those used for New Zealand, but the name of the country of issue will be substituted. (*Continued on page 330*)

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The Australian Gloucester set depicting the Duke and Duchess. This fine used set is of 3 values—2½d., 3½d. and 5½d.

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Stamp Gossip

POSTMARKS

IN these days, in spite of the fact that there are so many stamps available, or perhaps because stamps are so plentiful, sideline collections where stamps themselves are not the only consideration, or even the chief one, are becoming very popular. Some of these are concerned with postal history, and believe it or not, some of the items that have been collected go back hundreds of years. But all this may be rather over the heads of some of us, and anyhow it is merely postmarks on stamps to which I wish to refer now.

Recently I received a letter from South Africa, and only after it had been torn open did I notice that it had what philatelists call a "paquebot" cancellation. It is not rare, of course, and that is the point. If collectors will keep their eyes open they will quite often come across these ship postmarks, and they make a nice addition to a collection. One day we'll go into this question of postmarks more thoroughly.

SUBSTITUTE OR CHALKY?

Several collectors seem to be a bit confused over the terms used in connection with paper used for printing KG VI stamps, so perhaps I had better give a few words of explanation to clear the matter up. A number of colonial stamps previous to the war were printed on chalk-coated, or what is colloquially known as chalky paper. The printers claimed that this paper was used for security reasons, for if an attempt were made to remove the postmark some of the design would also come away. Probably the fact that a surfaced paper resulted in a clearer impression had more to do with it.

During the war it would seem that this paper was difficult to obtain, for paper without coating, or with very little, was used, and this was described in one of the catalogues as ordinary paper. It was anything but ordinary, and when the Commonwealth Catalogue was published, it designated the paper as substitute, and this word came into general use.

The easiest way to tell the difference between chalky and substitute paper is to rub it with a piece of silver. An old coin will do—not a new one, for these are minted of an alloy—and if a mark like that made by a lead pencil is the result that means that you have a chalk-coated paper. No mark, or a very faint one, denotes substitute.

The Commonwealth Catalogue gives separate listing to these important varieties, so it is as well to know not only what they are, but also how to tell the difference.

CECIL RHODES

Southern Rhodesia is justly proud of that great Britisher, Cecil Rhodes. Previously his portrait has appeared on a stamp of the country named after him, but on 15th April a set of five stamps was issued in honour of his Centenary. One of these is illustrated. Rhodes' portrait appears only on the 2d. value but

the set, which has been printed by Messrs. Waterlow and Son by the recess process, is very colourful — perhaps a little too colourful some may think— and the development of the country is illustrated on each value. The ½d. has to do with medical services, the 1d. with agriculture and the 2d. with the growth of cities and towns. The 4½d. is concerned with water supplies and the 1/- with transport.

Here indeed is a grand set, not only for collectors of British Commonwealth stamps, but for thematic collectors as well. A dealer friend who does a big trade with the U.S.A. tells me that the set is selling well over there.

THE FLOODS

Philately seems to touch life at many points. Stamps are issued for all kinds of purposes, some of them I am afraid, having as their object the tapping of collectors' pockets, but some are issued about which there will be no complaint. One of these is illustrated here. It has to do with raising funds for flood victims. Holland is the country concerned, and British dealers are pushing the sale of this modest stamp with the object of raising as much money as possible. Some of them are selling the stamps at cost and others give all the profit to the funds. Be sure to buy a copy or a block to help on the good work.

THE AUSTRALIAN QUEEN

While there may be two schools of opinion regarding the Canadian Elizabethan stamps—I for one think that the Coronation stamp is a magnificent effort, for it shows our Queen as a lady of poise and dignity—one can be sure that those for Australia will be welcomed by most. And it has to be admitted that the 3½d. value from this country, issued on 21st April, does depict the Queen as we like to see her.

Two other values, the 1d. and 3d., have the same design, and it certainly looks as if Australia may win from New Zealand the palm for the most popular set.

It is difficult to get a satisfactory design where a portrait has to be put in somewhere, and Australia is very wise to have one or two values showing the Queen, and others given up to different subjects. I am afraid that not everyone will like the portrait of Queen Elizabeth on the five definitive stamps issued May 1st by Canada. The values are 1c., 2c., 3c., 4c. and 5c., and the stamps are recess printed.

A TIP

A year or two ago I tipped the 1d. Barbados red of 1938, when it could be bought for a shilling. Now it costs at least six pounds. Well, here is another little tip about the 4d. greyish-green of Great Britain of the 1937 issue overprinted Tangier. About a shilling will buy that stamp today, and while it will probably never get up to the price of the Barbados stamp, it will certainly cost many shillings some day.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

WHEN GUNS SOUNDED INSTEAD OF BELLS

In June 1940 Alderney was in German occupation. When the enemy arrived, the beautiful old Church, which was built in 1850, was taken over, cleared of all its furnishings, and used as a general store. The bells were removed from the belfry, which was used as a machine gun post. The peal consisted of six bells, of which four were taken away to France, some eight miles to the east of the island, where it was presumed they would be melted down.

Alderney, together with the other three Channel Islands, was freed from occupation in 1945. It was found that one of the remaining two bells was still at the Church, where it had been used for signalling; the other was discovered near the harbour. Both these bells were intact.

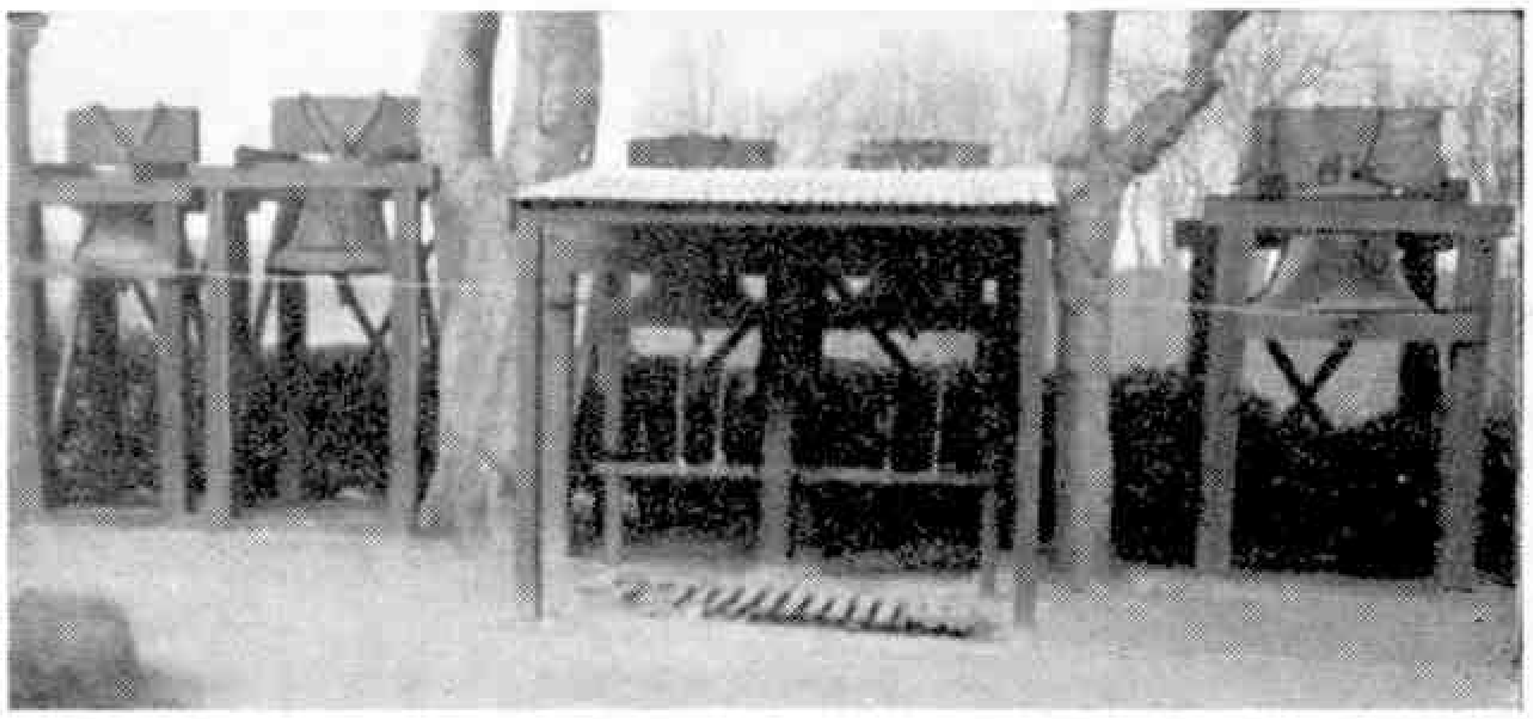
Eventually the military authorities traced the four bells in France. One was in many pieces, and another was badly cracked, but this was brought back along with the remaining two sound ones.

These arrived in Alderney in 1946, and the two sound bells, together with the cracked one and the two already on the island, were erected on a wooden framework in the Churchyard, where all but the cracked one are rung by pulling cords attached to the hammers. The accompanying photograph shows the bells, with the unsound one second on the left, and the shelter under which the ringer stands.

It is hoped one day, when sufficient funds are available, to send the peal to England for melting down and recasting, after which the bells will be hung in the belfry again.

The estimated cost of this work is £1,400.

M. K. BURNETT (Alderney, C.I.).



The bells of the beautiful old Church of Alderney in the temporary home in which they were placed after their recovery at the end of the war. Photograph by M. K. Burnett, Alderney, C.I.

THE MONTFORT FUNICULAR

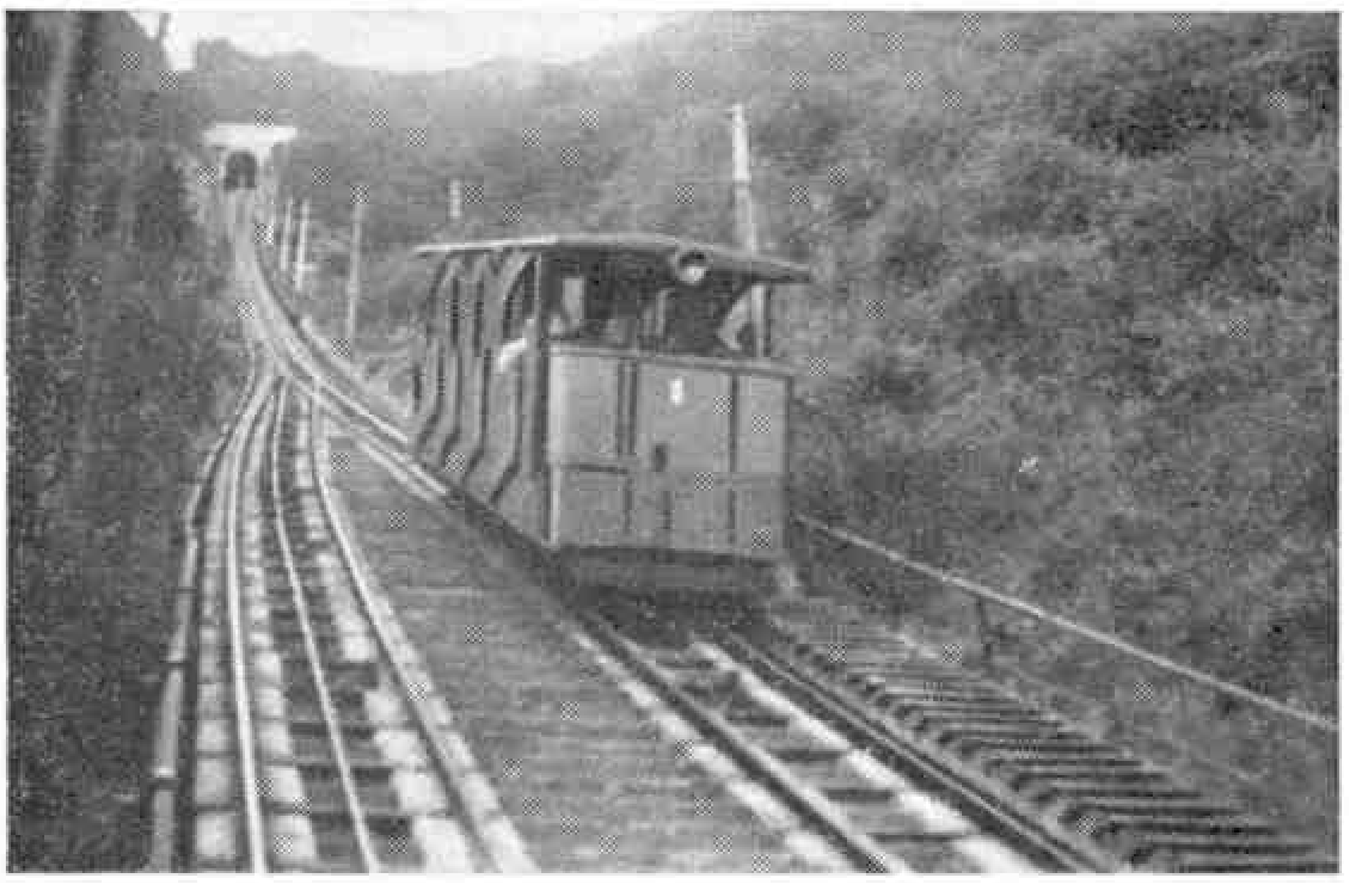
When spending a holiday at Grenoble, in the foothills of the French Alps, I was interested in a funicular railway that climbs up a cleft in an almost sheer cliff face from the village of Montfort, ten miles up the valley of the Isere, to St. Hilaire du Touvet, over 2,000 ft. above. This is claimed to be the largest railway of the kind in Europe, and it has several features that distinguish it from normal funiculars.

In the first place the track is neither straight, nor all of one gradient, and the towing cable is held in the centre of the track by pulleys set at an angle on the curves. The gradient varies from 10 per cent. at the upper and lower stations to 83 per cent. at the steepest part. This means that if one is ascending and sitting at the "front" of the car, one seems to be falling forward when the car is at either of the stations, but is leaning backward for a considerable part of the rest of the journey. Sitting in the "front" of the car on the downward journey is quite a terrifying experience, as one goes over the edge of the cliff to make the almost vertical descent. It is comforting to see that the conductor keeps his hand on the emergency brake in case the cable snaps!

The journey of 1½ kilometres from the lower station, 900 feet above sea level, to the upper, at a height of 3,200 feet, takes 20 minutes. Power is provided by an electric motor at the upper station. The track, which includes a 200-yard tunnel in its steepest section, is single, with the exception of a passing-place for the two cars at the half-way point.

The funicular carries a considerable amount of passenger traffic, consisting not only of tourists who make the ascent for the sake of the magnificent view across the Isere valley to the Belledonne range, snowcapped all the year round, but also of visitors to the several large sanatoria that surround the village of St. Hilaire. Small freight is also carried, for the long steep climb to the village along tortuous mountain roads makes road transport uneconomic for small loads.

D. A. GARNETT (Barrow-in-Furness).



The funicular railway at Montfort, in the foothills of the French Alps. It is claimed to be the largest of its kind in Europe. Photograph by D. A. Garnett, Barrow-in-Furness.

Competitions!

Open to all Readers

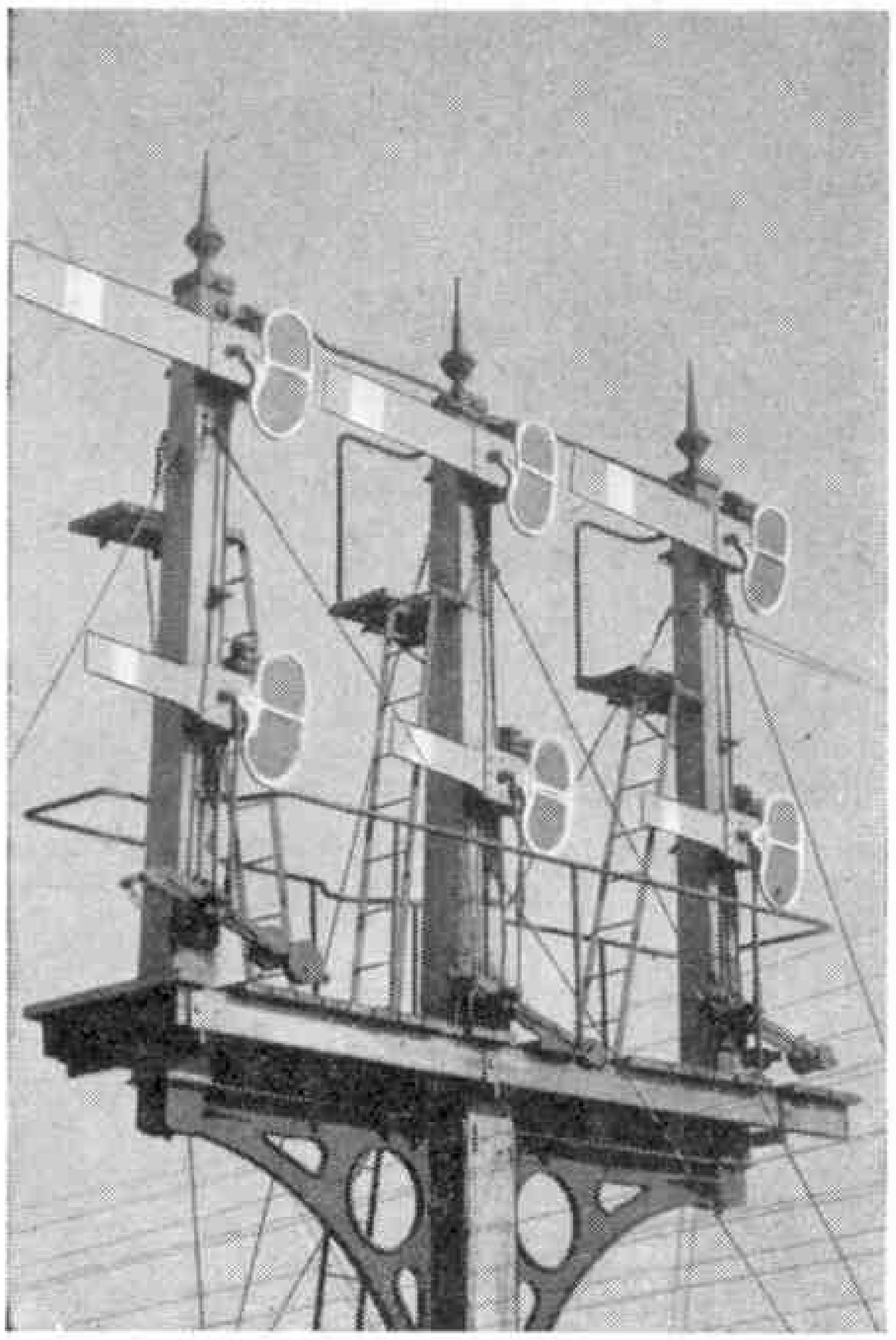
Railway Signalling Contest

There cannot really be a railway without signals, which are necessary to make sure that traffic can move in perfect safety. All readers of the *M.M.* of course are interested in signals, so our competition this month is concerned with them. Here are ten signalling questions, all easy really, and we are sure that railway-minded readers will enjoy the task of finding the answers. Those who are railway enthusiasts, but not familiar with signalling, will find that the contest will open a new and interesting field of study.

1. What is the difference in appearance between the arms, or semaphores, of "Home" and "Distant" signals?
2. What colour is the signal box lever for operating points?
3. What is a signal gantry?
4. What is a repeater arm?
5. What is the purpose of a yellow ground disc signal?
6. What is the aim of the absolute block system of signalling?
7. Can you tell the position of a signal arm from the rear at night?
8. Where two signal posts are mounted on a bracket, how does the driver know which signals refer to the main line?
9. What does a diamond-shaped plate on a signal post indicate?
10. Why is a large white board sometimes placed behind a signal arm?

The answers to the questions should be written in numerical order and should be kept as simple as possible, one side of the paper only being used, but the judges will take into consideration neatness and originality in presentation, particularly if drawings or diagrams are supplied. The competition will be divided into two sections, for home and overseas readers respectively, and in each prizes of 21/–, 15/– and 10/6 will be awarded, with consolation prizes for other good efforts.

Envelopes containing entries should be addressed *June Signalling Contest, Meccano Magazine, Binns Road, Liverpool 13.* Closing dates: Home Section, 31st July; Overseas Section, 31st October.



A good example of a three-way junction or bracket signal, with "calling-on" or shunt arms below the main semaphores. Photograph by W. S. Garth.

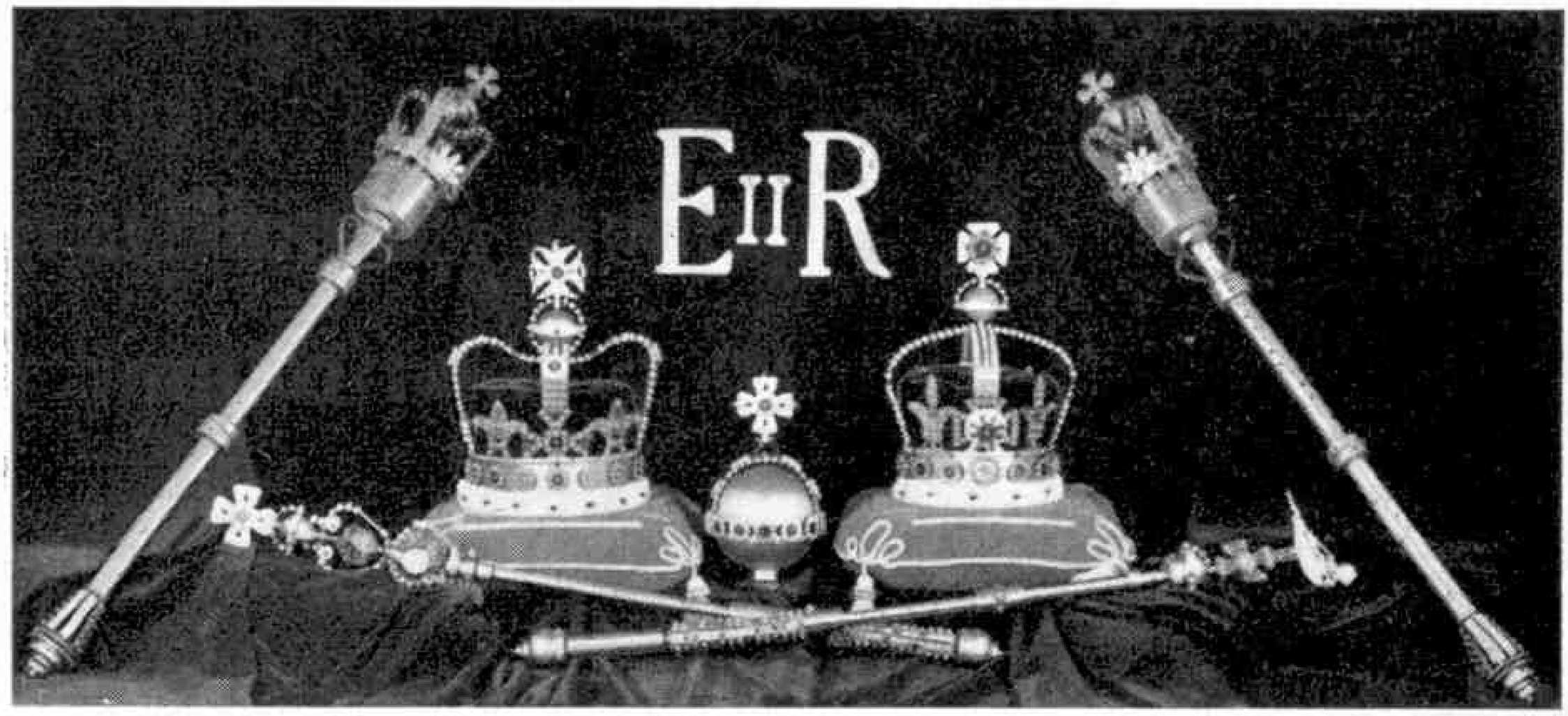
Coronation Photographic Contest

This month sees the Coronation of Her Majesty the Queen, and the celebrations in the Capital will have their counterparts in towns and villages throughout the country. Coronation festivities are therefore the theme of this, the sixth 1953 photographic contest, and the subjects chosen can be either the actual Coronation procession and celebrations in London itself, or whatever celebrations are held in the locality where the reader lives.

The usual restriction in these contests that only one photograph must be submitted is waived this month, but no competitor will be awarded more than one prize. Photographs submitted must have been taken by the competitor, and on the back of each print he must state exactly what the picture represents; also his age must be given.

The competition will be in the usual two sections, A for readers aged 16 and over, and B for those under 16. Each competitor must state in which section his photograph is entered. There will be separate Overseas Sections, and in each section prizes of 21/–, 15/– and 10/6 will be awarded. Entries should be addressed: *June Photographic Contest, Meccano Magazine, Binns Road, Liverpool 13.* Closing dates: Home Section, 30th June; Overseas Section, 30th September 1953.

Prize-winning entries in M.M. competitions become the property of Meccano Ltd. Unsuccessful entries in photographic, drawing and similar contests will be returned if suitable stamped addressed envelopes or wrappers are enclosed with them.



An outstanding attraction of the display of Meccano Ltd. at the 1953 British Industries Fair was the magnificent reproduction in Meccano of Coronation regalia shown above. Except for the use of rubber balls for such items as the Sovereign's Orb, this was constructed entirely of Meccano parts, some of which were specially enamelled in colour to represent jewels.

Starting Half-way up the Ladder—

(*Continued from page 285*)

particular, engine handling is simpler, there is no swing on take-off and the jet's nosewheel undercarriage landing is easier than tail-down landing. But they still have to waste several hours mastering the differences in technique; and the case for training jet fighter and bomber pilots on jets from the start seems a strong one.

At any rate, the Air Ministry have ordered a trial batch of Viper-powered Provosts, with retractable undercarriage, and in a year or two some young volunteers for R.A.F. aircrew duties will find themselves jet pilots from the moment they step into their first basic trainer.

Stamp Collectors' Corner—(*Continued from page 325*)

South Africa will have a 2d. stamp, but South West Africa will really do something big, for not only will it issue five stamps, 1d., 2d., 4d., 6d. and 1/–, which like those of South Africa will be bi-lingual —so we won't have to buy those pairs, which have such a habit of splitting—but the subjects will, apart from a portrait of the Queen, be of flowers indigenous to the country. With "flower" stamps enjoying so much popularity, this set may well prove to be the most popular of all.

Canada is contenting itself with a single 4c. stamp. and Great Britain is to have four stamps, but some of these are also to be overprinted for Bahrain, Kuwait, Morocco Agencies, Muscat and Tangier.

Well, that's a brave lot, and the cost will be within the reach of most of us, but here is a tip. The stamps will be very popular and a lot will be bought, so don't indulge in them as an investment.

The Operation of Royal Trains—

(*Continued from page 297*)

and staff of the Royal Household, so that the Royal train will be formed of several coaches both in front and in rear of the Royal Saloon in which Her Majesty travels.

The British Railways Royal train stock, which has recently been fitted with modern furnishings, is employed for long journeys and for night travel, but when the Queen makes a short day journey the train may consist of Pullman cars, or of one Pullman car—favourites are *Rosemary* and *Phœnix*—marshalled with first-class coaches. Five coaches is the usual complement of the train on these short journeys.

When the formation of the train for any particular occasion has been decided, measurement is taken of the distance from the footplate of the engine to the door by which the Queen will enter and leave the train. The entraining and detraining stations are notified of the distance and the platforms are marked at the points where the driver must bring the train to a stand. The door of the coach for the Queen will consequently stop at its appointed place, within a matter of an inch, adjacent to the carpet on the platform, and close to the station entrance, or to the Royal car where there is a roadway inside the station.

Strict time-keeping is a feature of all Royal arrangements. The Royal car will arrive at the station about two minutes before the train is due to leave. The Queen is greeted by railway officials, including the stationmaster with his top-hat; she steps into the train and the guard waves his nice clean green flag! The driver responds with a gentle, dignified start and another Royal train has started.

Master Pilot No. 1—(*Continued from page 307*)

Air Lift, flying to the west exports banned by the Russians; and its charter jobs range from carrying cows by the hundred to cheese by the ton, furniture and fire engines. And now Silver City's parent company, Britavia, have bought Aquila Airways, who operate flying boat services to Lisbon and the lovely holiday island of Madeira.

Air Commodore Powell, who has never lost his love for flying boats, has great plans for Aquila. As a start he plans to re-equip it with a fleet of Short Solents, most comfortable air liners ever built, so that he can simultaneously increase the frequency of Aquila's services and cut fares to a minimum. Later he may make a bid for the giant 100–200 seat Princess 'boats, which nobody else has the courage to operate. In the same way, he is already planning to use car-carrying helicopters on Silver City's air ferry, at a time when no other British airline operator has been willing to state specific plans for large-scale helicopter services, and has himself completed a helicopter pilot's course in America.

Coming from anyone else, such schemes might seem to have as much chance of early success as a space flight to the Moon. But Air Commodore Powell's ideas have a habit of proving right, and as a flying boat and helicopter enthusiast, I for one shall follow the achievements of Silver City and Aquila with great interest in the next few years.

Fireside Fun

Teacher: "And do you mean to tell me you just played truant yesterday afternoon?"

Pupil: "No, sir. I didn't mean to tell you, but somebody seems to have done that."

* * * *

"Why do you call your dog Smith?"

"Because he's so good at making bolts for the door.

* * * *

"Yes," said the burly athlete, flexing his arm. "With these muscles I could punch a hole through a door."

"That's nothing," said the little man alongside, bending **his** arm. "With my muscles I can stop a train."

"Yes," he added when the athlete looked surprised. "You see I'm an engine driver."

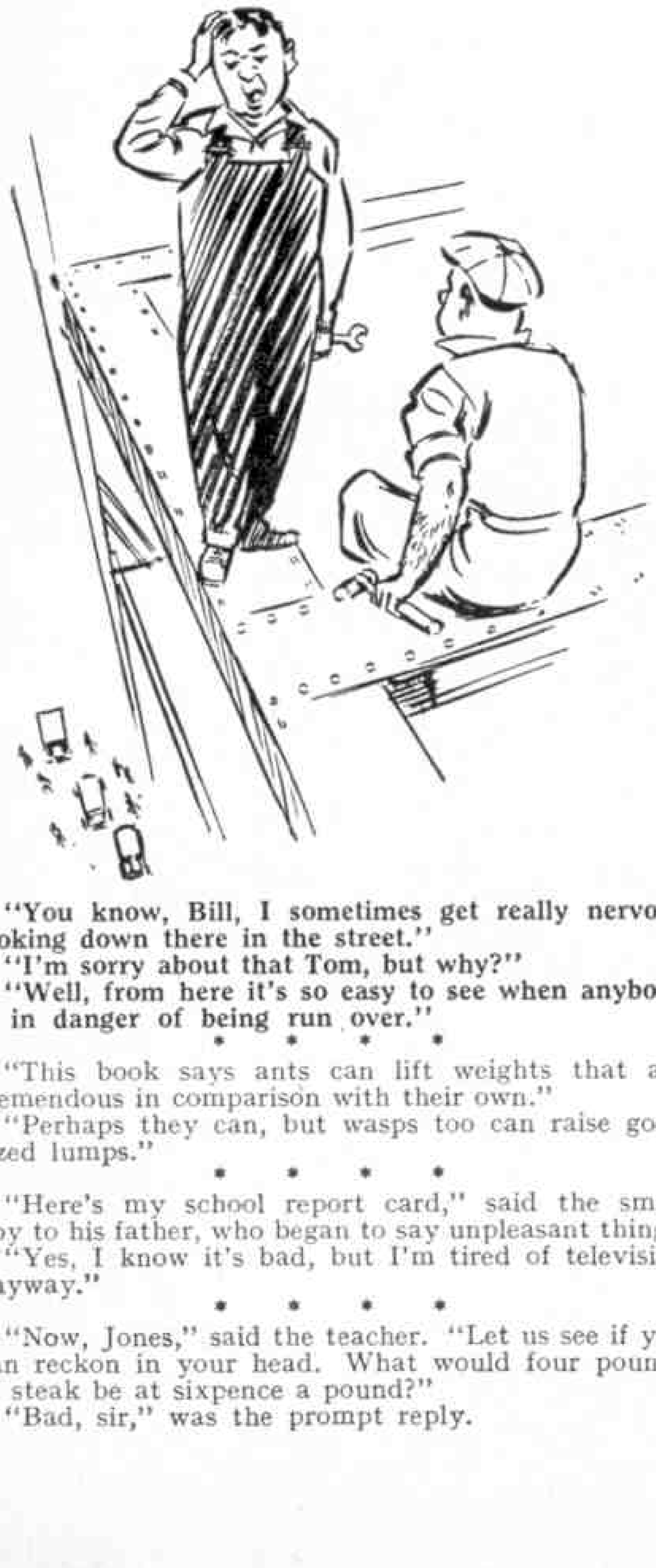
* * * *

"As a Briton I suppose you believe in free speech," said the man from next door.

"I certainly do," was the answer.

"Right, I'll just come in and use your telephone."

* * * *



"You know, Bill, I sometimes get really nervous looking down there in the street."

"I'm sorry about that Tom, but why?"

"Well, from here it's so easy to see when anybody is in danger of being run over."

* * * *

"This book says ants can lift weights that are tremendous in comparison with their own."

"Perhaps they can, but wasps too can raise good sized lumps."

* * * *

"Here's my school report card," said the small boy to his father, who began to say unpleasant things.

"Yes, I know it's bad, but I'm tired of television anyway."

* * * *

"Now, Jones," said the teacher. "Let us see if you can reckon in your head. What would four pounds of steak be at sixpence a pound?"

"Bad, sir," was the prompt reply.

BRAIN TEASERS

FORWARD AND BACKWARD

Reversing the three letters of the word RAT give another word, TAR. It is good fun to find other examples of this forward and backward reading, and I will give a small prize to the sender of the best list I receive by 30th June. No names allowed; all words must be of three letters and must be found in standard dictionaries. E.B.P.

* *

UNRAVEL THESE CAR NAMES

The names below do not look like those of cars, but by rearrangement they will give familiar car names. Can you find them?

1, RUMBHE; 2, RIBTOSL; 3, LIHLMAN; 4, TUSANI; 5, VISLA; 6, SANDDART, 7, SENNEJ; 8, YLLEESOW; 9, LOLSR RYCOE; 10, UGAJAR; 11, TEJOWT; 12, IELYR. M.S.

* * * *

TAKE IT EASY

The upper part of a sash window is semi-circular in shape, with a diameter of 2 feet. When it is lowered six inches a crescent-shaped space is left open at the top. What is the area of this space?

* * * *

Small boy: "How far will it go when he's finished winding it up, daddy?"

* * * *

DID THIS REALLY HAPPEN?

A shopkeeper counting his day's takings discovered the extraordinary fact that he had equal numbers of half-crowns, florins, shillings, sixpences, threepenny bits, pennies and halfpennies. The total of this remarkable collection of coins was £51 0s. 0d. How many half-crowns were there? S.W.C.

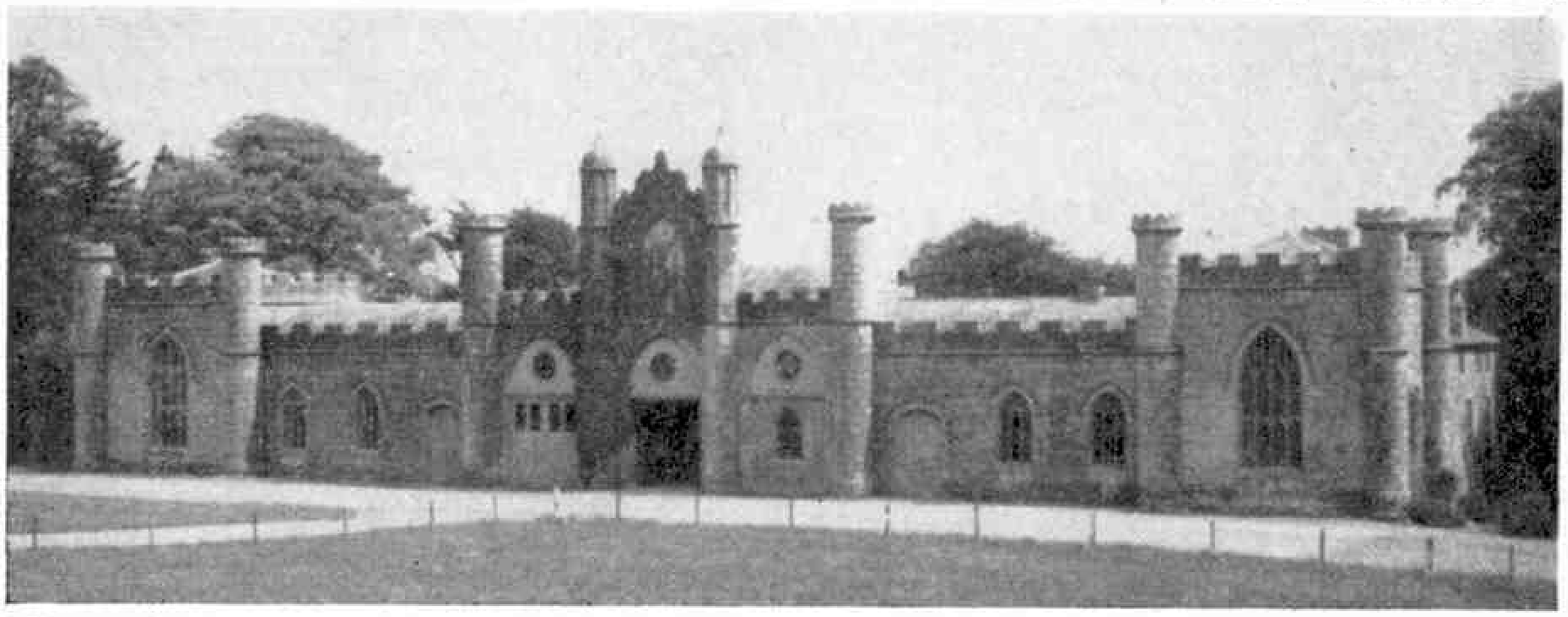
* * * *

SOLUTIONS TO LAST MONTH'S PUZZLES

A few minutes thought will reveal that the answer to the first puzzle last month is £1 10s. 0d. Those who are good with X and Y would solve the problem in a minute or so.

The words of the ARM group in our second puzzle were: GARMENT, ALARM, CARMINE AND MARMALADE. Those of the LEG group were COLLEGE, ELEGANT, LEGEND and PRIVILEGE; the words of the CHIN group were MACHINE, MARCHING, CHINA and URCHIN.

TRAINING FOR THE MERCHANT NAVY



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A.B.C. COMMERCIAL VEHICLES		2/–
A.B.C. TRACTORS		2/–
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A.B.C. CIVIL AIRCRAFT RECOGN.		2/6
A.B.C. MILITARY AIRCRAFT RECN.		2/6
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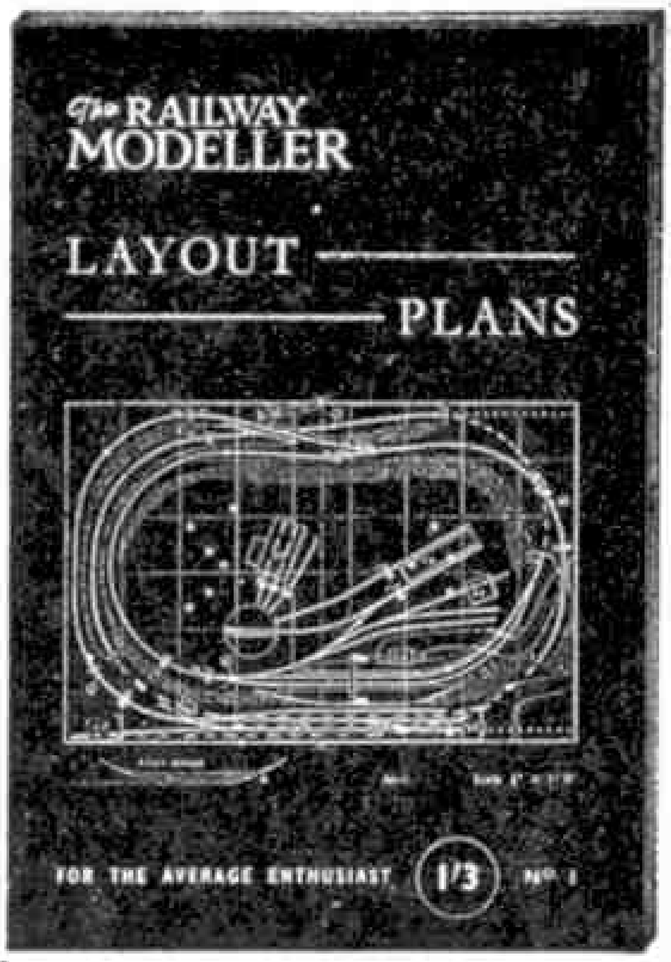

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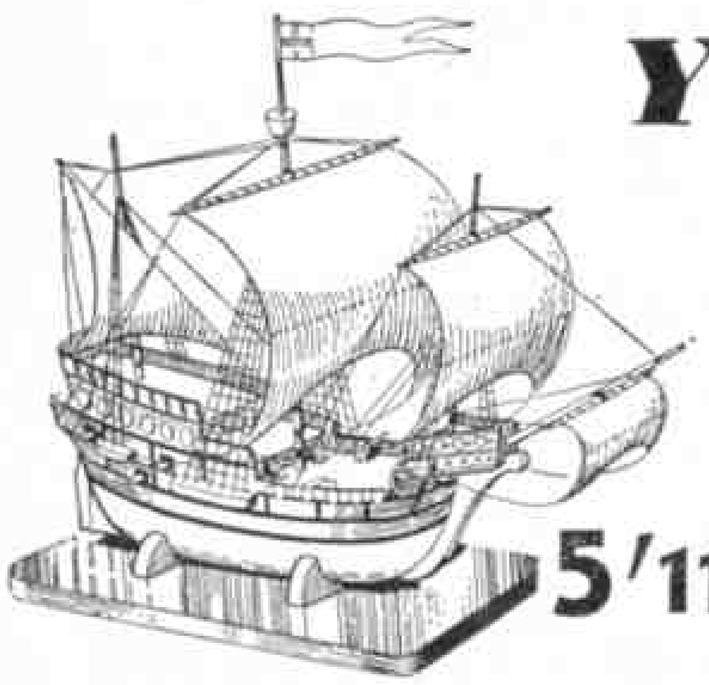

5'11

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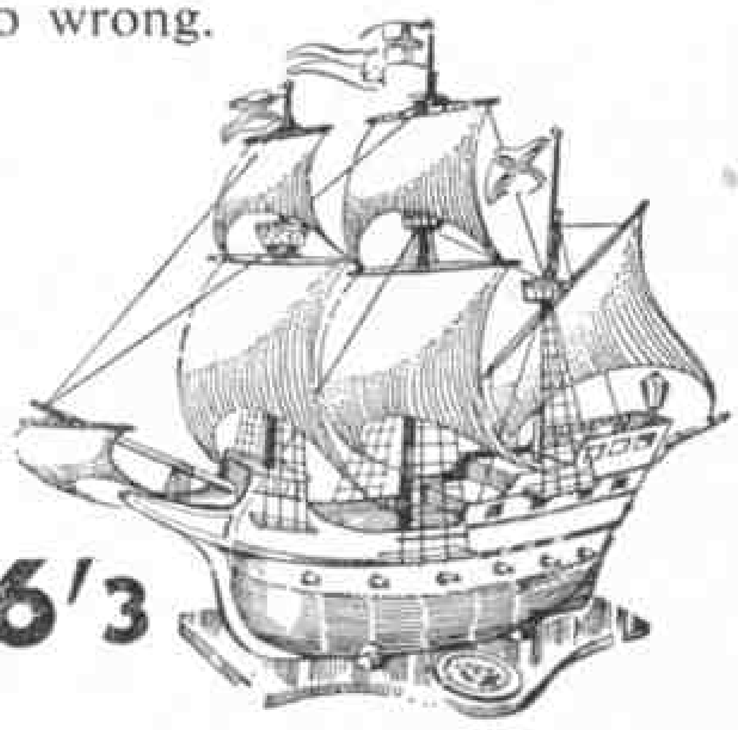

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12'6

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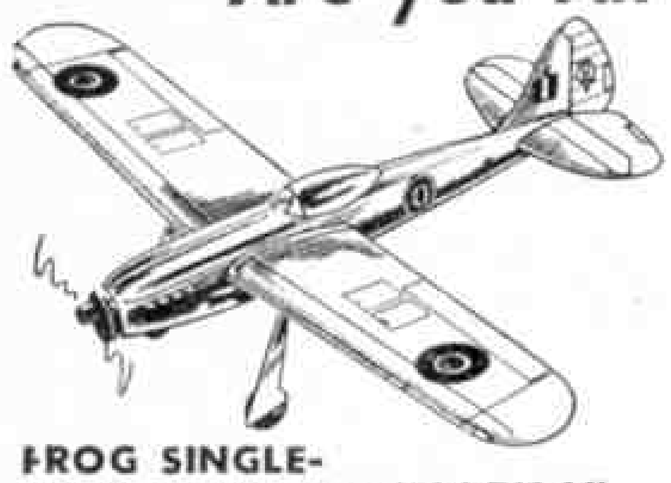

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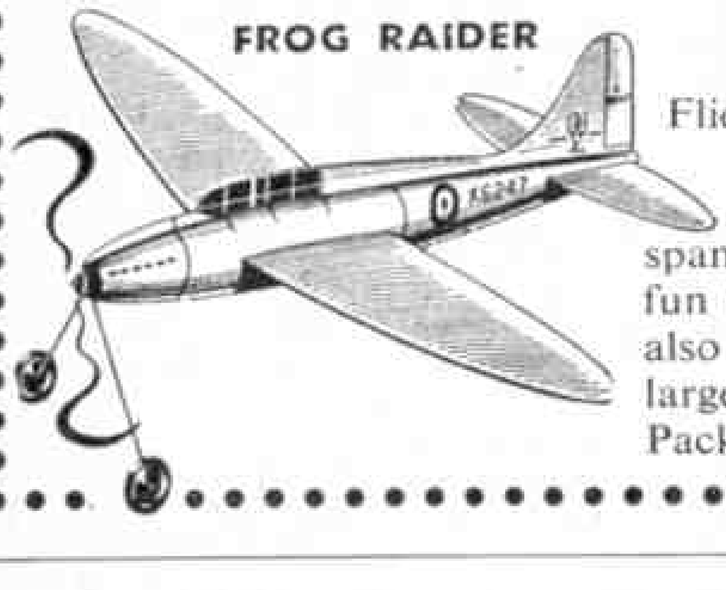

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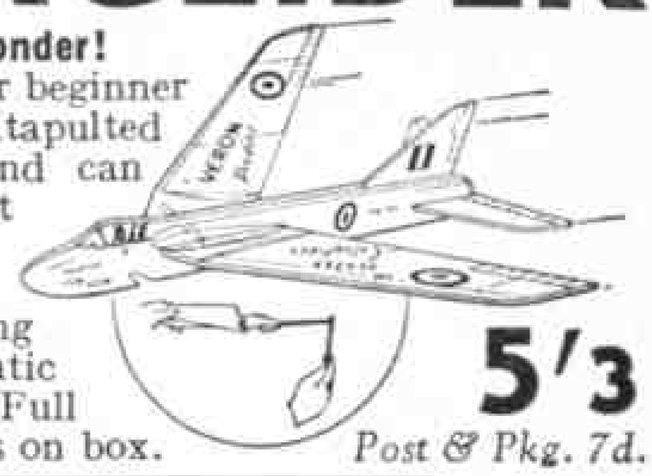

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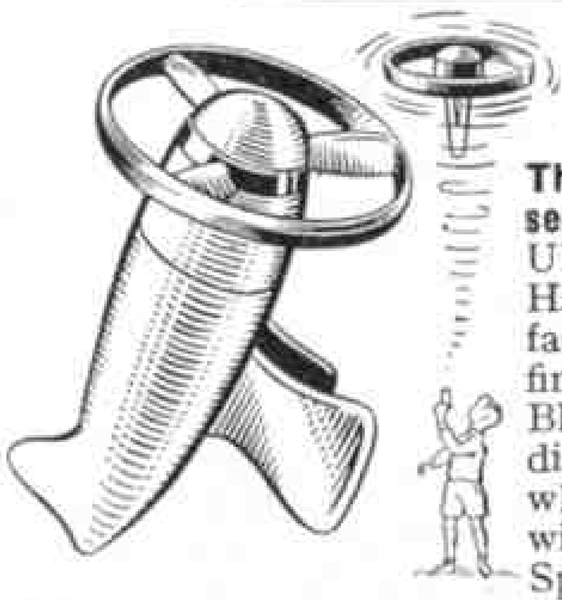

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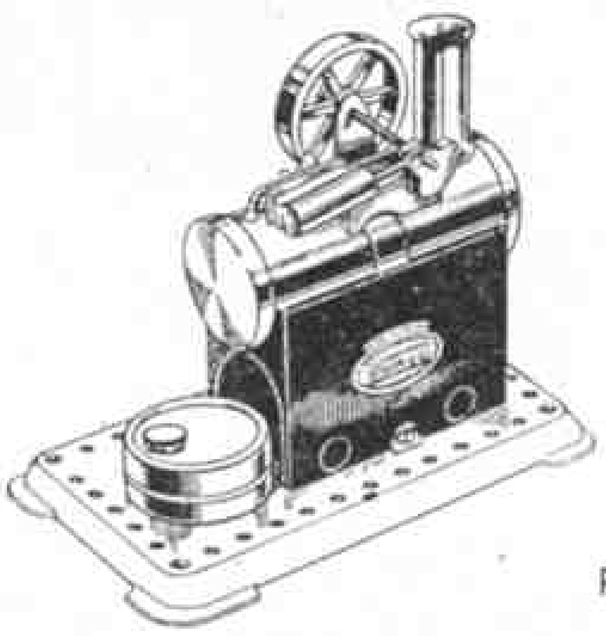

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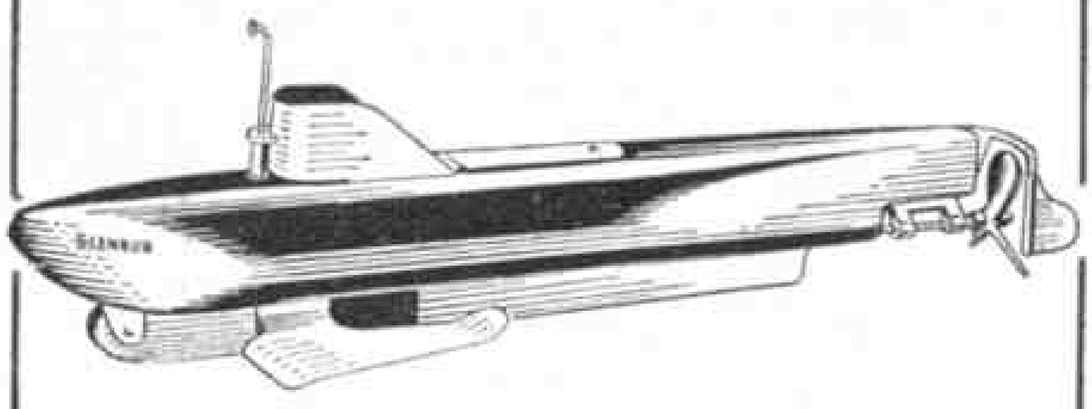

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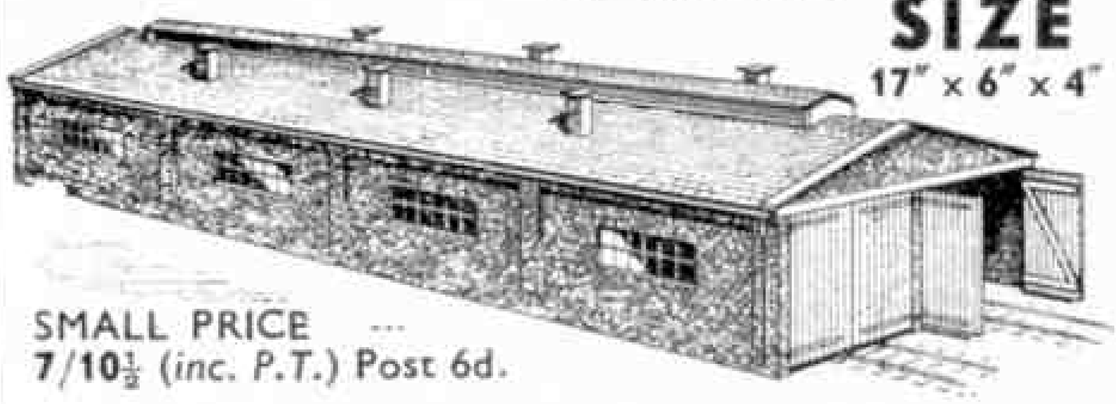

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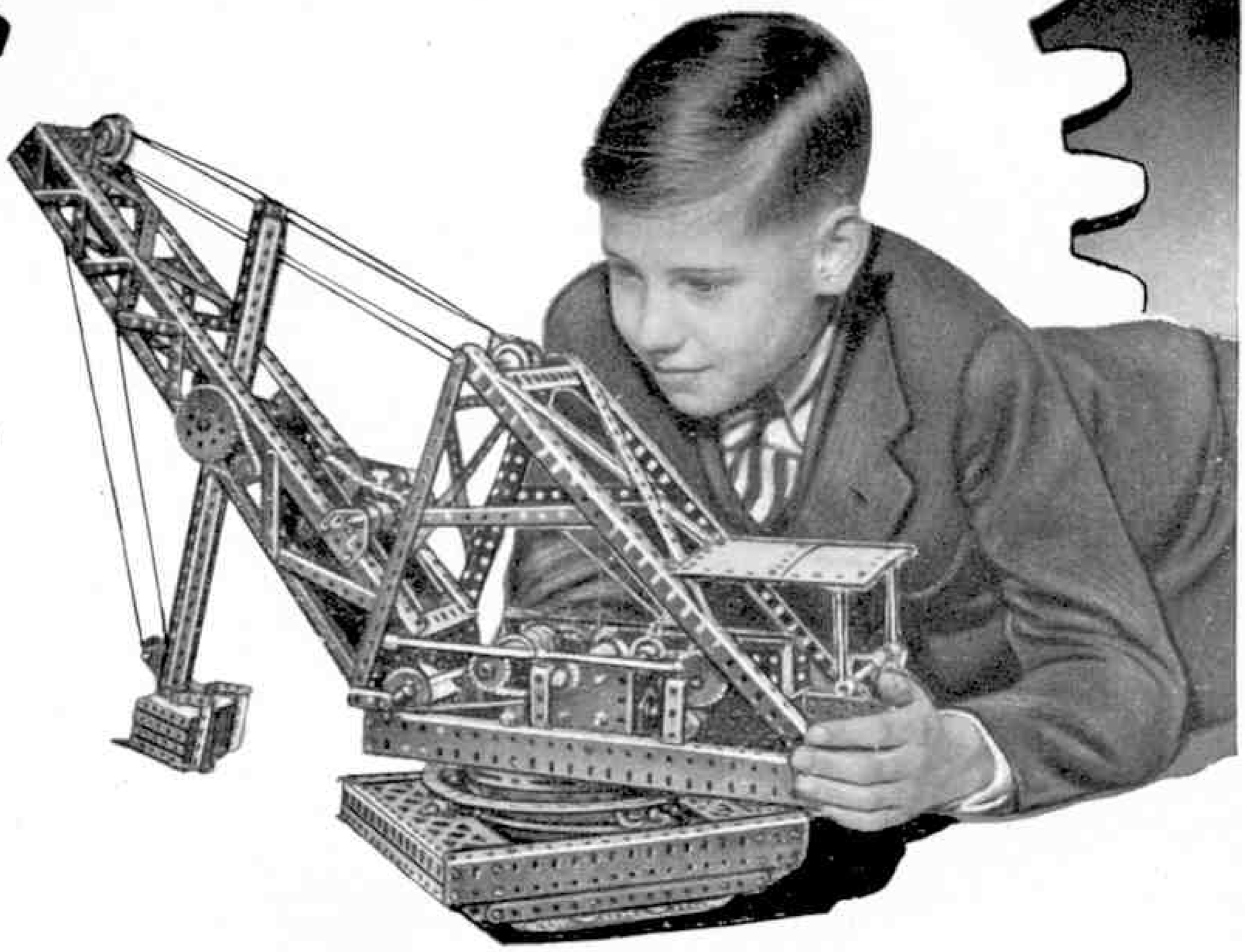

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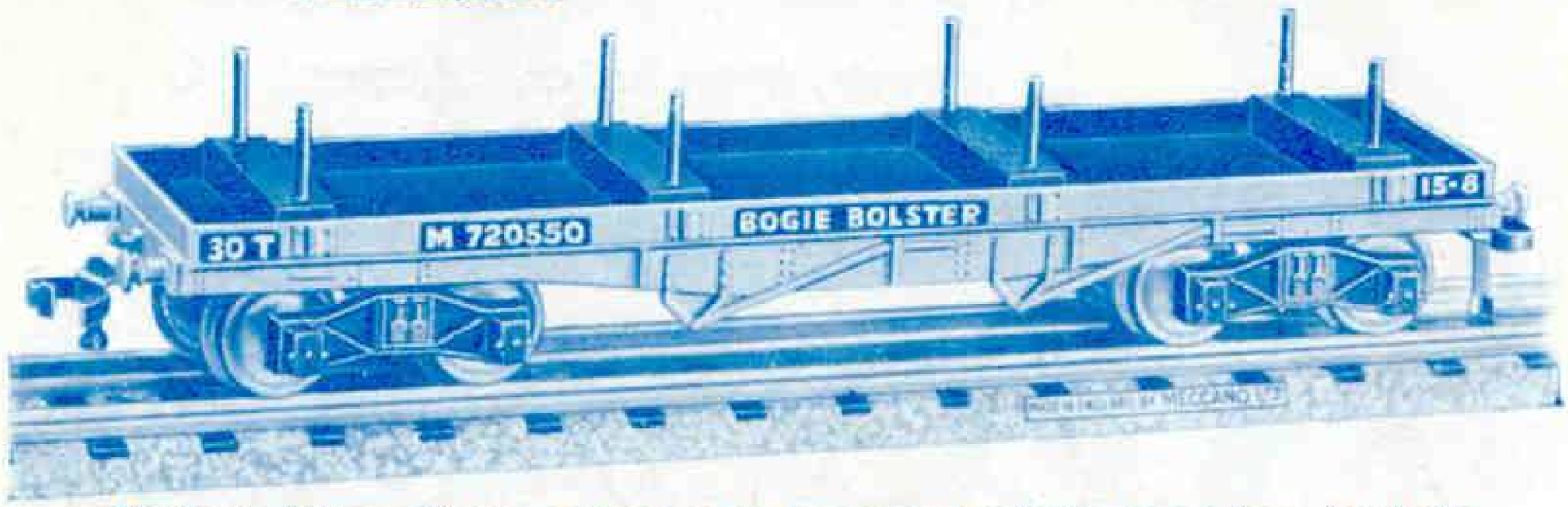

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